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SEPTEMBER 24, 1942

The IRON AGE

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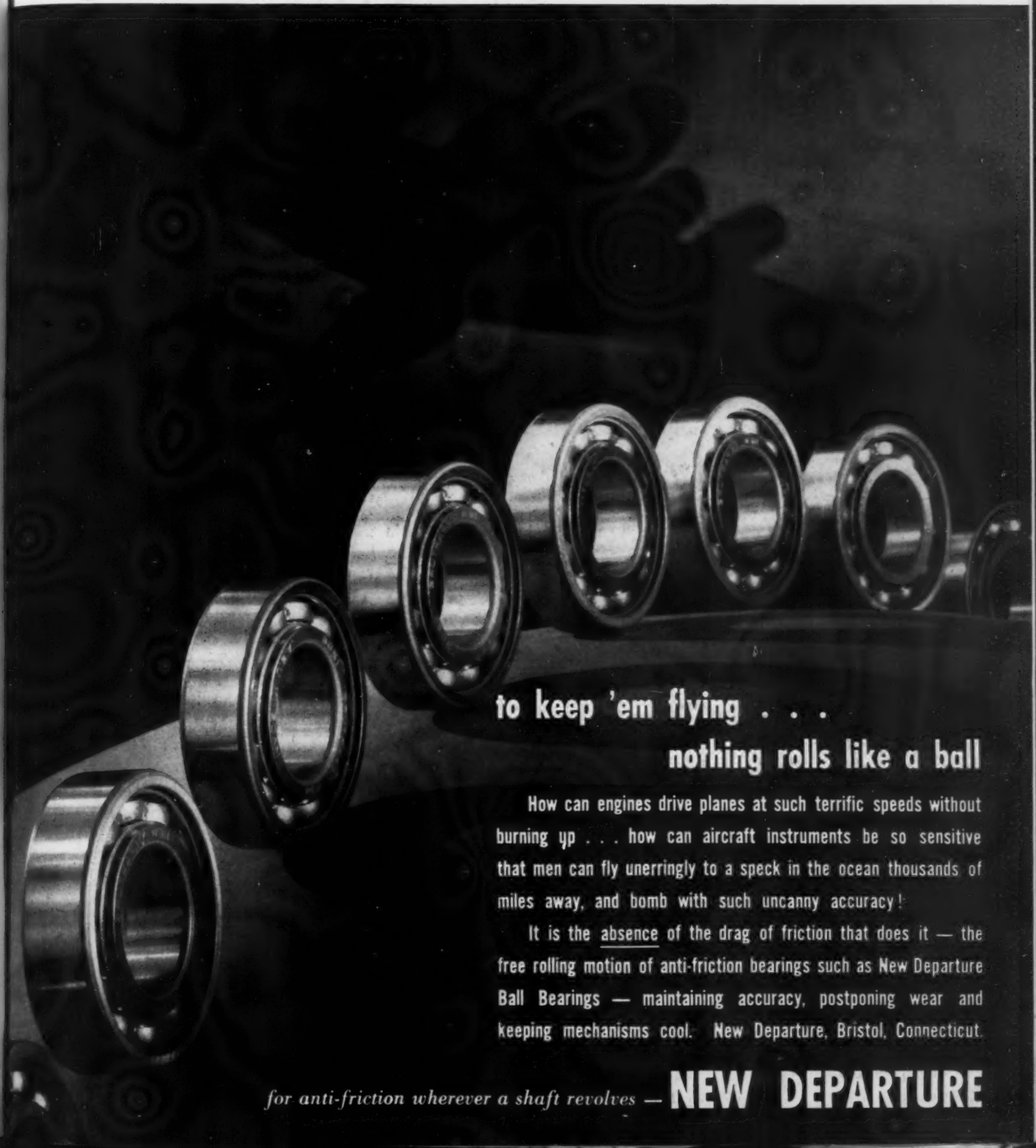

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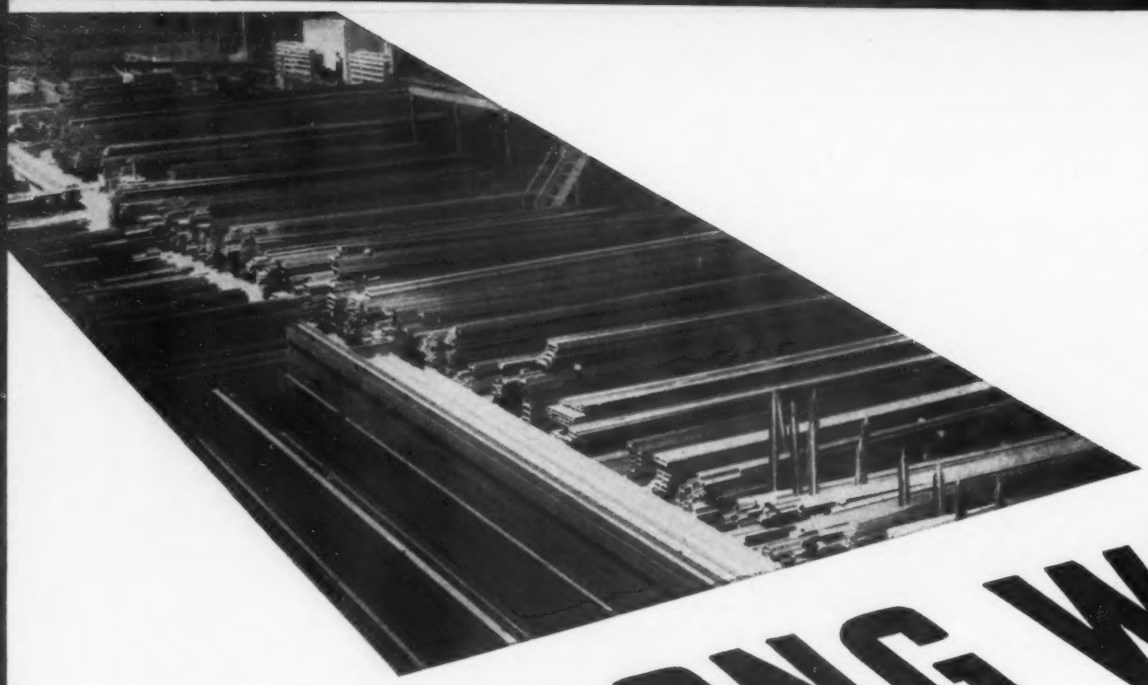

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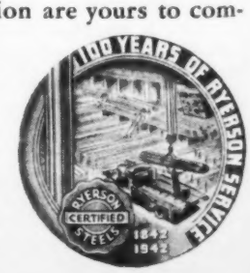

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THE IRON AGE

SEPT. 24, 1942

ESTABLISHED 1855

How to Lose the War

I Have heard so much and read so much on the subject of how to win the war that I am fed up on it. And I believe you are, too.

Columnists who have never shot off a gun; ex-majors who have never had command of a regiment are busily telling the Administration, the War Department, General MacArthur and the rest of the world just what should be done to win this war.

I think you will welcome a change, so I am going to tell you how to lose it. And I have gathered that information just from looking out of my office window.

My office happens to be at the corner of 42nd Street and Park Avenue, New York City. From one of my windows, I can see the 42nd Street front of Grand Central Station.

It's a fine building. It probably has 40 or 50 tons of copper on its roof, in case we might need it, but copper and brass, as yet, are not critical materials.

Number one heavy melting steel is a critical material, however, and I can see some of that from my window. Labor, especially the kind of labor that can fabricate plates suitable for shipbuilding is a critical item also, I am told.

Then, there is that matter of time, the most precious material of all. if we can call it a material. "So much to do, so little time to do it." Ah, those moving slogans!

For the past six weeks, I have observed a gang of structural steel workers numbering from three to six, dismantling and remantling the steel canopy over the eastern 42nd Street entrance to Grand Central. Roughly, this canopy measures some ten by forty feet.

If I were hard up for cash, as I usually am, and had not recently won a daily double, I would like to take a contract to do that job with three men in two weeks. Yet it is not half done.

With what tenderness and loving care these structural workers pat the rivets with their hammers, reluctantly driving them to and from their home! And with what delicate brush strokes they apply the red lead to the structural members. It is something to see and admire — if you are a friend of Hitler.

Now don't get me wrong. I like the New York Central and have commuted on it for thirty years. But I understand there is a war on and that a war needs skilled labor to win it. Skilled labor of steel workers in shipyards, tank plants and munition plants — not on canopies over railroad stations and hotels to keep Mr. and Mrs. Jones from getting a trifle wet when they leave their taxicabs after an evening at the theater, but to give at least a fair fighting chance to our boys overseas who are risking their lives and losing them for the folks back home.

I would hate to have these boys see what I see from my window!

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"Send us more scrap— and, we'll make more steel"

"We steelmakers can make more steel, *if you'll send us more scrap!* We are appealing to you because we need the help of American industry more than ever before.

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"It's so easy to look outside of industry at all the scrap that could be gathered—old automobiles and the like. But, do you know that there is only about 1,000 pounds of scrap in an old jitney, and that only one of the Inland banks of furnaces melts 9,000,000 pounds of scrap in 24 hours? That's 9,000 old autos a day—and they are just not coming in anywhere near that fast.

"That is why we are looking to industry to send us more scrap. Forget you've ever put on a drive. Start a new one now! Send to us, as soon as possible, that old building steel, unusable machinery, dead stores, and obsolete dies, jigs and fixtures.

"America is waiting for steel—our fighting men are waiting for ships, tanks, guns, shells.

"We steelmakers will make more steel for victory, when you send us more scrap."

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File Hardness Testing

BY JOHN H. HRUSKA

Chief Inspector, Electro-Motive Division, General Motors Corp., LaGrange, Ill

. . . A modern answer to the question, "how hard is file hard?"; a clarification of file hardness testing by the most up-to-date methods including the characteristics and selection of test files, preparation, standardization and calibration of results, taking into consideration the element of human error.

AS a simple instrument for the testing of hardness of technical matter, the file antedates probably any other. Alvaro Barba in his "El Arte de los Metales" (published in 1637) states that he used the file scratch test to differentiate between precious and ordinary stones—admittedly a very daring criterion for the value of some crown jewels.

Irrespective of this early application of the file test, practically no developments nor even attempts were made for nearly three centuries in clarifying the logical question "how hard is file hard?" A review of existing literature indicated only the few appended references, all dating back less than a decade. Complaints in this direction have appeared before technical societies, and it is with this in mind that some accumulated data is being presented at this time.

According to modern tool engineering, files are classified as edge tools. The multiple edges or "teeth" of the file must, therefore, be produced from such metal and with such treatment which permit repeated use without rapid dulling by wear or breakage. This prerequisite has been met by the manufacturers of modern files by choosing steel of the following general characteristics:

	Per Cent
Carbon	0.90 to 1.40
Manganese	0.25 to 0.50
Silicon	0.15 to 0.35
Phosphorus	Maximum 0.03
Sulphur	Maximum 0.03
Vanadium (if specified)	0.10 to 0.15

Test files made from this type of material are ordinarily of rather fine "cut," 6 to 8 in. long, and are usually made to "bite" material of Rockwell C-63 to C-65. Several reputable manufacturers offer test files of C-66 to C-68 Rockwell hardness. The production of these special files depends largely on the successful attainment of uniformity in surface hardness and toughness in heat treatment. To illustrate, compare the results of averages of Rockwell hardness tests made on five test files furnished by the three largest file makers in the United States (see Table I).

The usefulness of high-grade files as testing tools depends, in addition, upon certain design factors such as tooth contour, up-cut and over-cut angles, number of teeth per inch, etc. These characteristics of test files are summarized for five different specimens in Table II. Great strides were made in the file industry during the last two dec-

TABLE I

Surface Hardness of American Test Files

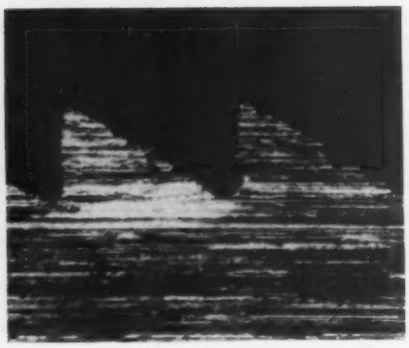
File Number	Nominal Length, In.	Average Rockwell Hardness		
		Tip	Middle	½ In. from Tang
H-1	4	66.5	66.8	66.0
N-1	6	66.9	66.8	65.8
H-2	6	66.8	66.2	65.8
D-2	8	66.5	66.8	66.5
D-1	8	66.3	66.7	66.2

TABLE II

Characteristics of American Test Files

File Number	Type of File	Nominal Length*, In.	Maximum Width, In.	Maximum Thickness, In.	Average Tooth Distance, In.	Number Teeth per In.
H-1	Mill	4	0.437	0.094	0.0218	42
N-1	Pillar	6	0.484	0.146	0.0160	60
H-2	Pillar	6	0.409	0.195	0.0150	60
D-2	Pillar	8	0.562	0.188	0.0248	38
D-1	Mill	8	0.750	0.126	0.0186	50

* Length measured from tip to tang.



LEFT

FIG. 1—Photomicrograph profile of 6-in. test file enlarged to 50 diameters.

RIGHT

FIG. 2—Photomicrograph face view of 6-in. test file enlarged to 50 diameters.

ades in the perfection of these design factors. The uniformity of product was checked repeatedly and the modern test file is certainly a reliable tool for the purposes intended. Micrographic examination of the face and sides of such files indicates best the precision under which they were produced.

Photomicrographs, Fig. 1 and 2, represent average conditions of such test files. Fig. 1 indicates that the teeth are very sharp as furnished and it is only logical that care should be exercised not to abuse such test files in actual service. Fig. 2 indicates the top view of a test file depicting also the relative angles between up-cut and over-cut.

In commenting on these characteristics of test files, it should be borne in mind that their purpose is definitely not the removal of stock but rather the production of a multiple scratch on the test material. Analysis of the fundamentals governing the mechanics of a scratch indicates that perhaps the most important of factors is the shape and hardness of the penetrating edge. The entire problem may, of course, be simplified by producing a sharp point of known or measurable hardness. In order to utilize this thought effectively, round or square bars may be heat treated to a definite hardness, ground to a 65 to 90 deg. point and used subsequently for the determination of actual scratch hardness expressible in Rockwell "C," Vickers, or Brinell numerals.

In order to facilitate handling of a smooth bar, it was found more convenient to use a round or even square file which prevents slippage in the fingers and thereby enables the operator to apply a somewhat heavier pressure against the point. Successfully used files of various hardnesses ranging from C-45 to C-66 are shown in Fig. 3. Actually obtained correlation between the drawing temperature and Rockwell "C" hardness is presented in Table III. These figures are graphically represented by the diagram Fig. 4.

Selection of Files

The file scratch test has definite value in ascertaining surface hardness of irregular parts or of extremely small areas thereof. Production requirements necessitate, however, the knowledge of uniformity over larger areas of heat treated parts. In order to verify average conditions, it is much more desirable to have a series of such scratches produced and thus check the average conditions rather than minute spots. Whenever possible, multiple scratches, such as produced by the application of a suitable test file, are much more informative.

By following the same principle as that given above, test files may be selected which are more convenient in size or design to suit specific requirements. In many cases, the standardized dimensions, tooth size or length may be more suitable if standard test files or even standard files of available dimensions are heat treated to a hardness which will cover specific hardness ranges. Most commercial test files are C-65 to C-68 in hardness. These limits indicate only the actual grouping of tested material, either above or below the hardness of the test file.

It has been found by actual measurements that usefulness may only be attained if the files are comparatively small in length and cross-section. Lengths from 4 to 8 in.

TABLE III

Effect of Drawing Temperature Upon Rockwell Hardness of Round Files Used for Scratch Hardness Testing

Drawing Temperature, Deg. F.	Nominal Hardness	Hardness at Point	Hardness Near Shank
80	66	65.8–66.5	66.5–66.8
210	64	64.0–64.0	64.5–64.5
400	63	62.8–63.5	62.8–63.2
480	60	60.2–60.4	60.4–60.8
550	58	58.0–59.0	58.8–59.2
630	55	55.0–55.2	54.0–54.0
750	48	47.5–48.5	48.0–48.5
860	45	44.4–44.8	44.4–44.8

All specimens were held at temperature for 20 min. and cooled in still air outside furnace.

have been found most convenient. In addition, the design of the file should definitely permit a checking of the file material at various spots by means of conventional hardness testing methods, such as the Rockwell, diamond pyramid, or Knoop procedures. This consideration makes the pillar file of about 6 in. long perhaps the most desirable of all test files used for practical purposes. The file should not be destroyed for verification of its hardness and, therefore, the sides of the pillar file have been found most convenient if practically smooth, without any teeth. Fig. 5 shows the face of three test files and Fig. 6 the sides ground smoothly, preparatory to making five Rockwell impressions on the entire length of the tool. The preparation of test files under strict metallurgical conditions has been conducted in the following manner:

A dozen 6-in. pillar files has been secured and the fact established that all files were produced from the same heat and bar respectively, thus assuring uniformity of the file metal. The chemical analysis of one of the previously annealed files gave the following results:

	Per Cent
Carbon	1.22
Manganese	0.32
Silicon	0.29
Sulphur	0.023
Phosphorus	0.016
Chromium	0.03

All samples used later were ground parallel on the narrow sides, that is, on those sides without any teeth. One of these test files was then broken into specimens about 1 to 1½ in. long and drawn at various temperatures. In order to eliminate the question of cooling rates during slow furnace cooling, all samples were held for 20 min. at various drawing temperatures, removed from the furnace and permitted to cool in still air to 80 deg. F.

After this heat treatment, the sides of the specimens were smoothed on emery cloth and four Rockwell tests made. The average of these determinations was then recorded as resultant hardness for the corresponding drawing temperatures. Practically the same procedure was followed with the actual test files. Ten files were thus prepared by drawing and testing them for hardness as indicated in Table IV. The hardness data of both series of tests were combined graphically and indicated against the rather smooth curve shown as Fig. 4. For convenience, conver-

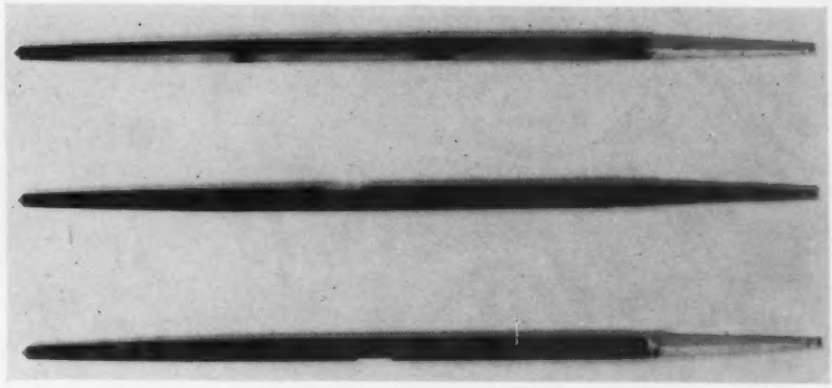


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FIG. 3—Pointed scratch test files. Note the ground surfaces for penetration hardness testing.

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RIGHT

FIG. 4 — Effect of various drawing temperatures upon the hardness of commercial files.

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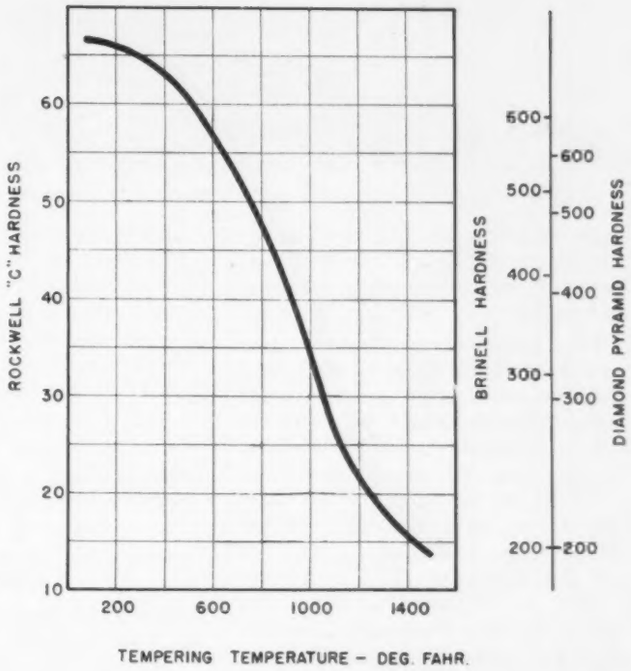
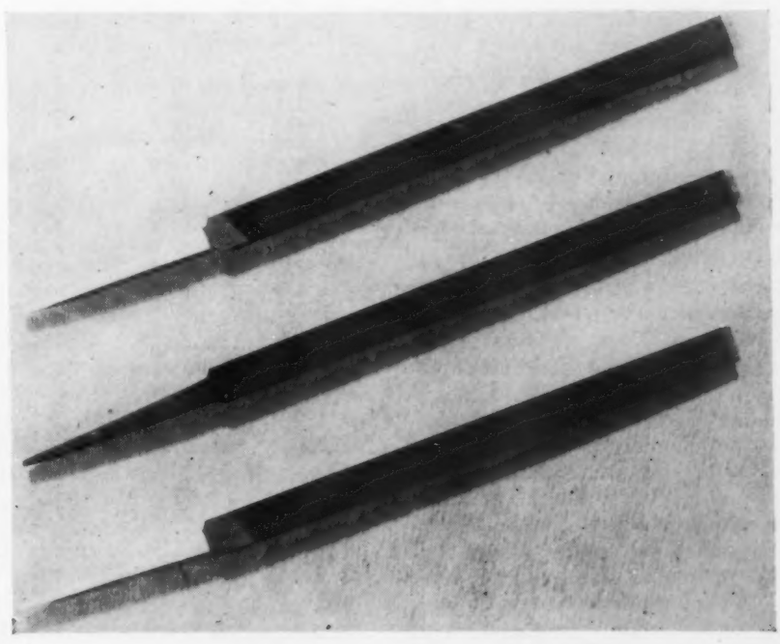
BELOW

FIG. 5 — Face view of three 6-in. test files.





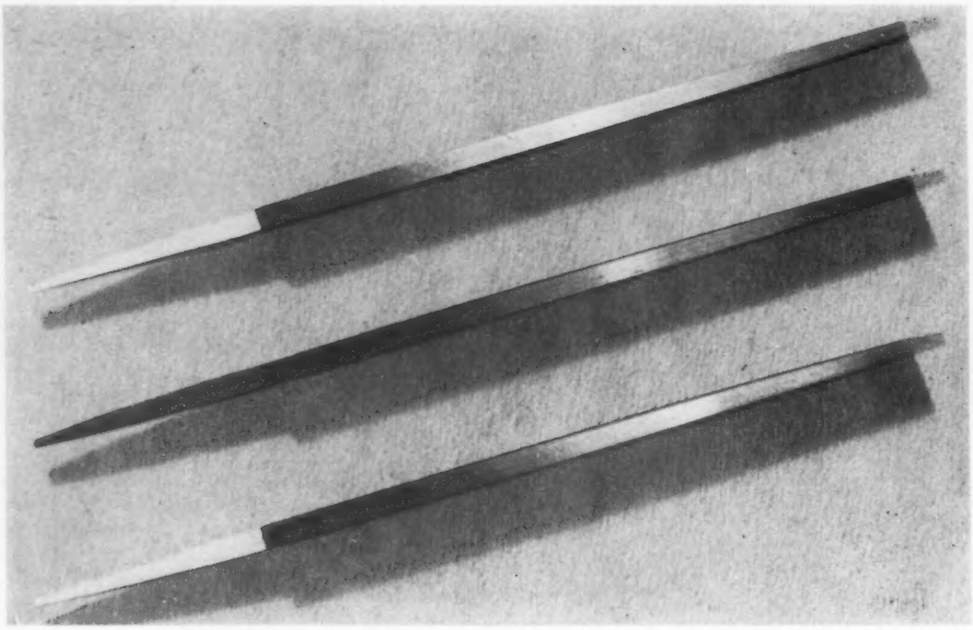


FIG. 6—Side view of three 6-in. test files showing the smooth side prepared for penetration hardness testing.

sions were made, permitting the use of these files for determining Rockwell, Brinell or diamond pyramid hardness.

File hardness testing is primarily a rapid shop control test, and for reasonably precise work some thought should be given to standardization of this procedure. In carrying out this effort, two principal factors enter into consideration or into the informative value of the test, namely, the file and the operator. The above described procedure seems to give a fair uniformity to the file. On the other hand, the much heralded importance of the operator has been definitely overemphasized.

In order to obtain unbiased information, the test files were given to eleven different operators with no actual experience in the handling of test files. Table V summarizes these observations. It is quite evident that there is practically no difference in the results and in the effect of previous experience, or the lack of it, on the part of these operators.

Before making final reports as to hardness of parts tested by the file scratch method, some means of ascertaining the nominal hardness from the "feel" should be applied. Perhaps the simplest method of checking commercially secured files, drawn to various tempers, is by heat treating representative samples of the stock to be tested to various hardness ranges. These test pieces should be of the same general type of metal, identical contour, such as flat or round, and similar in size and surface finish. The usual method of calibration is for the operator to make a few very short strokes on the surface being tested, and to determine from the reaction of the piece, the approximate surface hardness of the same.

Another suggested method of calibrating test files has been by heat treating a small round bar of high carbon steel of about 3/8 to 1/2 in. diameter and 4 in long. The treatment is carried out in such manner as to obtain a gradation from C-65 or C-67 on one end of the round, with hardness tapering down to C-55 or C-57 on the opposite end. The intermediate hardnesses between these two ends are verified by actual Rockwell or Diamond Pyramid hardness tests made accurately on a 1/4 in. wide, ground flat, on the entire length of the calibration bar.

TABLE IV

Effect of Drawing Upon the Hardness of 1.22 Per Cent Carbon Test Files

Drawing Temperature, Deg. F.	Rockwell Hardness "C"	Test Made with Test Pieces (T.P.) and Files
80 (no draw)	66.1	File 1
219	65.7	T. P.
410	62.5	T. P.
449	62.1	File 2
506	60.2	File 3
521	60.0	File 4
541	58.6	File 5
550	57.9	T. P.
580	58.0	File 6
645	54.6	File 7
650	54.0	T. P.
750	50.6	File 8
760	49.5	T. P.
805	47.0	T. P.
830	45.0	T. P.
855	44.4	File 9
901	41.8	T. P.
960	38.1	T. P.
1020	32.8	T. P.
1065	29.5	T. P.
1090	27.7	T. P.
1150	23.6	T. P.
1200	21.5	T. P.
1248	19.7	T. P.
1480	14.0	T. P.

The actual test results obtained from the hardness penetration are etched next to the corresponding test mark made by the Rockwell or Pyramid hardness test. In order to use this bar, comparisons are made by attempting short strokes in that hardness area for which the test file was intended.

The Human Factor

Micro-hardness measurements made recently on the tips of the file teeth indicate that files of C-67 Rockwell hardness will definitely bite steel of C-64 to C-65. This difference in resistance to scratch is somewhat less pronounced at lower hardnesses—an observation similar to that made by geologists when scratching minerals of the various hardness ranges defined by the Moh scale.

In the past, no attempt has been made to utilize the file to define numerical hardness. Even the calibration was much simpler, as ordinarily, a standard test piece measuring 7/8 x 3/32 in. of 1.30 per cent carbon steel, was hardened and

drawn to 375 deg. F. This operation produced a hardness of C-63 to C-64 and a good file was expected to bite this test piece easily. In order to verify how much lower the actual hardness of the piece tested was, the operator had to use considerable judgment and experience was, no doubt, necessary for such testing. The knowledge gained in the use of files of various hardnesses seemed to place experience of the operator distinctly in a subordinate position, and it was with this viewpoint in mind that the above summarized attempt has been made to eliminate the human factor in file hardness testing.

The relative file hardness is a function of the actual hardness expressible in Rockwell, Brinell or Diamond pyramid hardness of the file material. Accordingly, softer files are useful criteria for relatively softer materials. Toward the end of the last century it was, therefore, assumed that file hardness would not exceed C-50 to C-58 Rockwell. With increasing knowledge of metallurgical properties of steels, this fact was accompanied by improvement of manufacturing processes, thus raising the minimum hardness at which a test file would "bite" well above C-60. Under present circumstances, the generally acknowledged minimum limit would be C-63 to C-64. The previously described methods broaden essentially the degree of file hardness to almost any desirable value. For purposes of precise specifications, it will, therefore, be advisable to designate "file hardness" equivalent to corresponding penetration hardness numerals.

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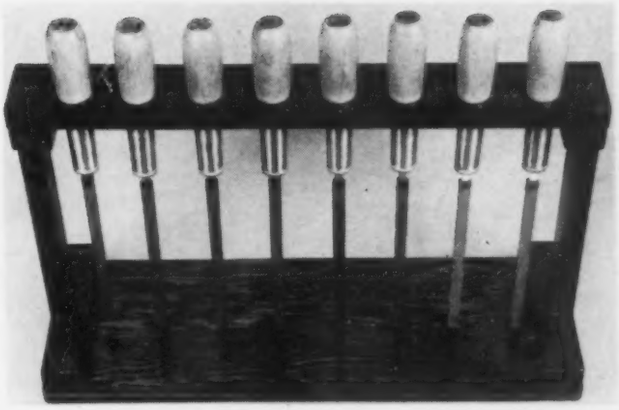

FIG. 7—File hardness test set, showing comparative Rockwell C hardness numerals at the end of handles.

TABLE V
Test Results with Three Files by Different Operators

Operator	Estimated File Hardness by Rockwell "C" Conversion		
	Specimen "A" (Round)	Specimen "B" (Flat)	Specimen "C" (Irregular)
Metallurgist	62	62	66
Engineer	62	64	66
Inspector	60	62	66
Pyrometer engineer	62	64	64
Secretary (female)	62	60	66
Blacksmith	62	62	66
Laborer	60	62	64
Factory worker (female)	62	62	66
Machinist	60	62	64
Toolmaker	60	60	66
Welder	60	62	66
Actual measured hardness (average)	C-61.4	C-63.1	C-65.5

Glass Fiber Insulation Used for Brass Furnace

WITH mica listed as one of the nation's critical materials, the Western Cartridge Co. has successfully used Fiberglas tape in place of mica as coil insulation in the primary coil of induction-type brass furnaces.

The 38 furnaces of this type installed in the Western Cartridge Co. plant have a sleeve-shaped form composed of ceramic material which retains the helical flat copper coil. Fiberglas tape is spiraled between turns in the coil to form a double helix composed of alternate layers of copper and Fiberglas tape. Insulation between turns in the coil is required to prevent short circuiting.

It is said that the use of the Fiberglas tape insulation made it practicable to increase furnace temperatures to the point where it was possible to produce five pours of 1500 lb. each during each 8-hr. shift, whereas with the mica insulation the limit was three pours of 1500 lb. each during each 8-hr. shift—an increased production of 300 lb. per shift, per furnace.

The cost of the glass fiber insulation was 50 per cent less than the mica it replaced. The number of man-hours required to install the Fiberglas insulation was less than half that required for the installation of mica.

Approximately 1000 of the induction-type furnaces are used by the large brass companies. Most of these companies follow the practice of rebuilding their own cores when such rebuilding is necessary.

Casting High Speed Steel

° ° °

By W. F. SHERMAN

° ° °

Both sand and centrifugal casting methods, using permanent molds, are employed at the Gorham Tool Co., Detroit, in casting high speed steels. Such steels, when cast in rough tool shapes, are easily and economically finished, and are unusually resistant to abrasion and wear.

A NEW electric steel foundry designed especially for quantity production of cast high speed tool steel, including both sand cast materials and centrifugally cast materials produced in permanent molds, has been put in service by Gorham Tool Co., Detroit.

It is producing an unusual abrasion resistant tool steel that literally bridges the gap between the conventional high speed tool steels and the cemented carbides. The casting process makes it possible to pour this special high speed steel directly into tool blanks or into shapes which are subsequently made into tools without any mill working operations.

In addition, experiments by L. C. Gorham, president of the company, point in the direction of possible success in the casting of cutters with teeth formed in them. Such tools are already in use in an experimental way.

Modern, progressive type layout is displayed by the foundry, which incorporates an extremely up-to-the-minute materials handling system used in conjunction with two 200-lb. furnaces of the Ajax induction type, one 30-lb. Ajax induction furnace, and two 50-lb. Detroit rocker arc furnaces. The two latter furnaces have been used for a major part of the experimental work and for the production of this type of high speed steel since about 1938 when it was first offered to the trade. As in the accompanying plant layout diagram, the foundry includes a pattern shop, standard sand handling equipment, a concrete-imbedded rail system for transporting molds to the pouring floor, and a well-designed cooling and shake-out area. A two-ton overhead crane services the entire working floor of the foundry. The pattern shop is small, compact, and efficient; and is admirably fitted to the type of work it has to do.

The casting technique, as mentioned above, makes use of sand molds or permanent molds, for conventional pouring or for centrifugal casting, depending upon the size and contour of the parts being cast, and the quantity.

Sand and Binders

Early in the experimental stages of the development of this cast high speed tool steel, it was learned that a selection of a proper mixture of grades of sand and binders was one of the big problems to be overcome for successful casting. The main difficulty was the elimination of porosity in the castings. The molding technique, as well as the material, has been developed in detail and varies from that ordinarily employed in casting. For instance, the layout or the "pattern" of individual tool blanks in molds has been found to require exceptional molding experience. In attempting to cast a dozen or more tool blanks at one pouring, the problems to be overcome were many. Under such conditions it is necessary to obtain rapid solidification of the cast materials in order to get the desired grain structure, but the solidification has to be very uniform to prevent cracking from strains set up in cooling. Such cooling cracks have been a leading cause of tool breakage, and it matters not whether the cracks are set up as a result of heat-treating or in the casting of the tool.

While Gorham cast high speed steel was first made available commercially about four years ago after four or five years of experimental work, Gorham's experience with cast high speed steel extended back to World War I when attempts were made with some success to cast tungsten high speed steels. At that time the goal was simply cost reduction through the quick production of a low priced tool. It was the advent of molybdenum steels that stirred interest because it was apparent that some of the difficulties encountered in casting tungsten steels might be overcome by the use of a molybdenum analysis. Working with molybdenum alloys, he introduced a variant from the typical moly tool steel analysis by adding boron.

Abrasion Resistance

A small percentage of boron has the faculty of giving these steels a greatly increased resistance to abrasion. It also gives the steel a resistance to the formation of a decarburized surface and soft skin. Of no importance in the cast material, but quite a factor if there had been an attempt to forge the tools, is the fact that a higher boron content decreases the forgability of the material. Therefore, the most satisfactory method for producing

an alloy with a high boron content is to use the casting process.

This high speed steel has the following analysis: Molybdenum 8 per cent, chromium 4 per cent, vanadium 2 per cent, cobalt 8 per cent, and boron 1 per cent. It is produced in the electric furnaces by charging mild steel scrap and the proper alloy additions. When molybdenum scrap is available, a large percentage of it is used in the charge. It requires 45 min. to melt and prepare a 200 lb. charge for pouring.

It appears that the resultant alloy is a material that fits into the physical range between the forged high speed steels and the cemented carbides, with some of the physical characteristics of both incorporated in the new material.

Producing finished tools from this cast steel appears to offer no unusual problem. The castings are annealed for easy machining, making possible the production of complex tools without extensive mold outlay since the annealed blanks are machined as readily as though made of ordinary high speed steel. The blanks are machined by boring, turning, milling, etc., to the desired shape, leaving only sufficient stock for finish grinding after heat treating. Cast-to-form blanks which

TAPPING the Ajax furnace for a heat of high speed tool steel. The 200-lb. charge requires 45 min. for each heat.

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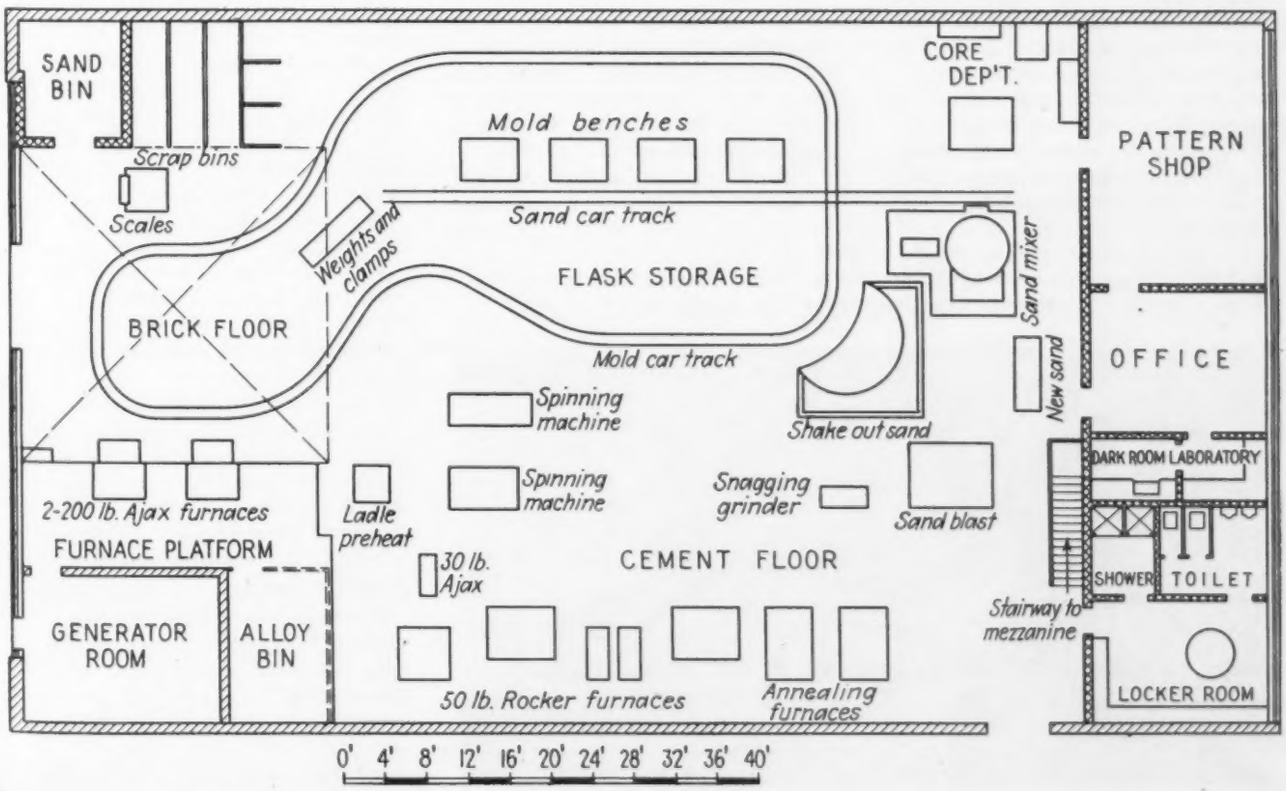
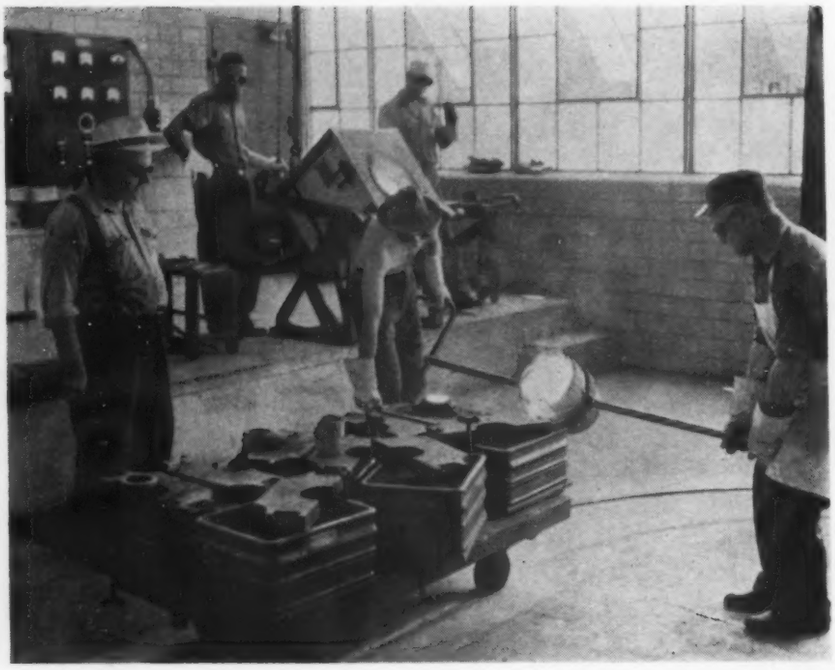
BELOW

THIS ultra-modern foundry layout is for the casting of molybdenum high speed tool steels of a special analysis, including boron. The plant includes pattern shop, core department, modern sand mixing equipment, up-to-the-minute material handling system, Ajax induction type electric furnaces and Detroit Rocker Arc furnaces, and special spinning equipment for centrifugal casting.





CASTING high speed tool steel. Molds are transported on trucks on the rails embedded in concrete A few feet from the pouring area the weights and clamps are removed, adjacent to the storage place for the weights and clamps.

reduce the amount of machining also are being produced, as mentioned elsewhere in this article.

Finishing

Heat treating schedules have been worked out by which any desired hardness from 60 to 70 Rockwell "C" can be obtained with no decarburization and a minimum of distortion. The finish grinding and resharpening operations are carried out with standard grinding wheels on standard equipment, the strength of this material permitting either machine grinding or hand grinding, and giving an excellent cutting edge without subsequent honing or lapping. In general, the same cutting clearances are used on cast steel as on the forged high speed steels, but because of the inherent wear resisting properties, rubbing clearances such as concave on the sides of cutters, etc., can be removed or materially reduced without disturbing the over-all efficiency of the tool.

For the material thus produced, an unusual red hardness is claimed in addition to wear resistance. Experience indicates that it is particularly valuable on two types of applications: (1) Cutting operations at speeds well in excess of the speed at which such forged steels break down, and (2) on difficult operations at normal speed where abrasion dulls forged high speed tools at an excessive rate.

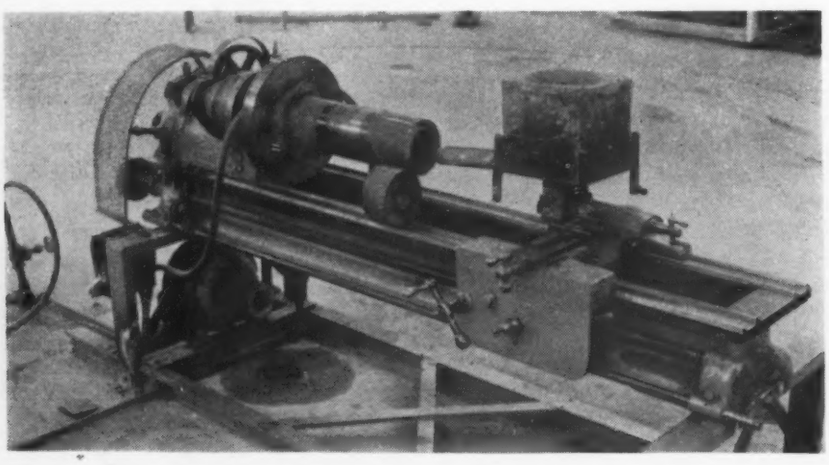
Under average conditions, it is claimed that the cast material will perform satisfactorily at surface speeds above those possible with the forged material, this ability opening up a field of application lying between the accepted fields of the forged high speed steels and the cemented carbides. Normal cutting speed limits for cast and forged high speed steels and for cemented carbides are shown in Table I. Where intermittent cutting must be done, the cast material will operate at high speed, withstanding severe shock conditions and cutting faster than is possible with forged high speed steel, according to the Gorham company.

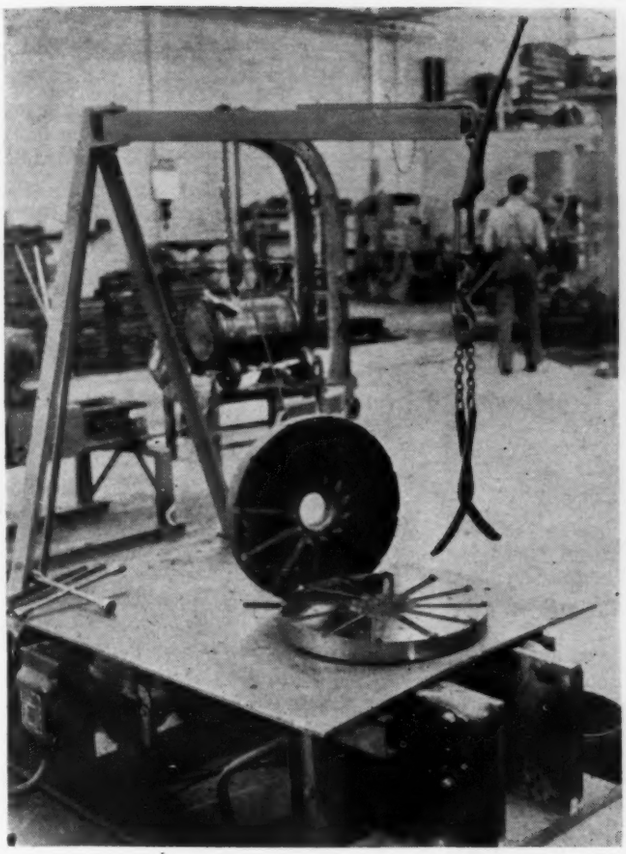
In this connection it is pointed out that the cast material is not a cure-all and does not make it possible to step up all production simply by use of the material. It is the opinion that forged high speed steel will remain the most economical tool material on jobs where it performs acceptably and where it is impossible to take advantage of the increased production possibilities of a higher surface speed because of the limitations of the machine tools or the design of the part being machined. Likewise cemented carbides will continue to be the best tool material on those jobs where it is possible to establish the ideal condition for their use and the surface speed can be stepped up high enough for satisfactory tool life. Between these two fields is the place where the cast high speed steel will find its economic application.

Examples of these applications include current use on tank armor plate and extensive use on aluminum. The material shows ideal resistance to wear even on aluminum pistons, which have a high silicon content and traditionally are very rough on tools.

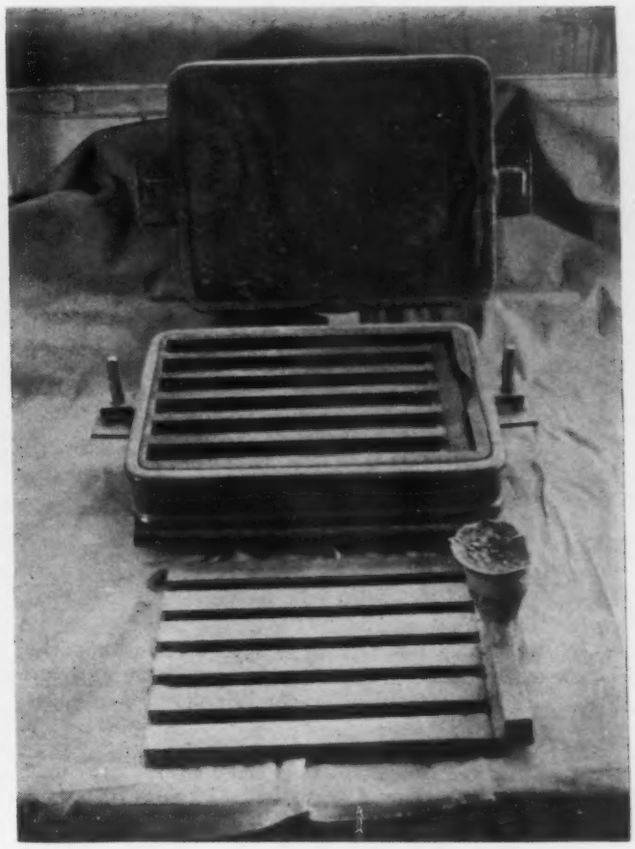
Certain operations, such as the milling of keyways in axleshafts, where the width of the cut must be maintained in spite of repeated sharpening of the cutter, are ideal situations for cast tools. This is true since concaves and clearances

HIGH speed steel is centrifugally cast in this horizontal spinning machine, a result of extensive experimentation over a long period of years.





ON a vertical axis, high speed steel is cast centrifugally in this spinning machine by the Gorham Co. In this and the machine shown in photo at bottom of opposite page, permanent molds are employed.



SAND molds prepared to avoid porosity in the castings of tool blanks (the latter shown in front of the open mold). Small diameter welding rod is also being cast of this material, by this method.

that are essential to free operation of forged tools can be almost entirely eliminated on these cast tools. Because the cast material is not severely affected by abrasive operation, sharp corners are maintained on the tool and the part and dimensions are held to close tolerances throughout the tool life.

Where complicated form tools are required, the cast material has proved to have exceptional advantages. In such instances, the cost of making and maintaining irregular formed tools and cutters of cemented carbides is excessive, even if surface speeds could be increased enough to suit such applications. The fact that the Gorham cast high speed steel is as easily machined as the forged type, but will operate at much higher speed under difficult conditions, makes it a desirable material for use in such cases.

Principal limitations are in the manufacture of extremely small or thin tools that are difficult to cast economically. However, these tool styles that are not adapted to the casting process are infrequent.

The cast material has the unusual characteristic of being virtually free from hardening distor-

Approximate Operating Speed Limits of Forged and Cast High Speed Steel and Cemented Carbide Tools.

Tool Material	Hardness Range, Rockwell "C"	Approximate Surface Speed,* Ft. Per Min.										
		Aluminum	Bronze	Copper	Cast Iron	Cast Steel	SAE 1112	SAE 1020	SAE 2320	SAE 3135	SAE 4340	SAE 6145
Forged high speed steel	62 to 65	300 1000	100 300	200 600	60 90	50 140	80 140	80 140	60 125	60 125	60 125	60 125
Gorham cast high speed steel	60 to 70	300 1000	100 350	200 600	60 150	50 200	100 225	100 200	80 175	80 175	80 175	80 175
Cemented carbide	70 to 81	300 1500	150 500	200 600	80 350	125 250	500 600	375 400	225 275	225 275	275 325	225 275

* These surface speeds indicate approximate limits and operating speeds must be worked out to suit each set up. Factors influencing the best operating speed are: Capacity and condition of machine tool, method of holding work, size and type of tool, and material and type of work being machined.

A VARIETY of cutter blanks and cast-to-form cutters is shown here. The cutters in which teeth are formed in the casting have been ground to final size and finish, nothing more.

tion. This is important in the production of unground form tools and cutters since coupled with freedom from decarburization, it permits the use of the material on jobs that require accurate forms but are not economical to grind to shape following heat treatment.

An outstanding example of such an application is the use of cast high speed steel in the manufacture of unground serration cutters in the wider sizes. When these cutters are made of forged steels, there is a strong tendency for the blanks to bulge in the center with a consequent error in the cumulative pitch dimensions. Serration cutters of cast high speed steel are regularly produced with a cumulative pitch error of only 0.001 in. over a width of three to four inches. Similarly, unground form relieved cutters come through the hardening operations with much less distortion of the form than is possible with the use of forged steels and with no appreciable decarburized skin.

The cast material is being used for a variety of purposes besides cutting tools. For instance, centerless grinder work rests of this material have been used, with results almost exactly comparable to the results achieved with cemented carbide wear strips and similar work rests.

Centrifugally cast bushings of this material also are in use, and cast welding rod, made of the same material, is being used with acetylene torches for applying wear resistant welds wherever required. Since this material has air hardening properties, it can be tipped onto shank steel and used for cutting tools without further heat treating. A ⅛ in. thick layer under such conditions will give a 63 to 64 Rockwell "C" reading. On thicker welds the surface Rockwells at 63 to 64, but the hardness decreases through each layer of weld to about 50 Rockwell "C" on the lowest layer. In some applications, of course, such thick layers do need subsequent annealing and heat treating.

Heat treating can be accomplished in any equipment normally used for treating high speed steel and the technique is very similar to that used regularly with other material. Gorham uses electrically heated controlled atmosphere furnaces.

Sodium Light Improves Microscopic Inspection

THE use of sodium light in the microscopic inspection of small parts has proved effective in increasing worker's efficiency for the detection of minute flaws, pits and cracks, according to recent information developed by H. A. Breeding, of the General Electric Illuminating Laboratory, Schenectady.

The unusual perception of detail under sodium light is due to the monochromatic nature of the light as the eye, in common with other lenses, actually focuses only one narrow wave or color band at a time, according to Mr. Breeding. Other colors which may be present in the light only tend to fog the clarity of the image. Thus, minute detail may be lost in examination under multi-color light while clearly perceptible under monochromatic light such as sodium light. An additional factor is that the human eye has always been accustomed to seeing more yellow-green objects than any other color and has gradually developed a visual affinity for light in this color band. Consequently, the pale golden yellow of the sodium light falls very near to the spectrum band where maximum eye sensitivity occurs.

In using sodium light for inspection it has been found that a broad distribution of the light is better than concentration in a bright spot. In this way an undistorted view of both the size and shape of the flaw is obtained. The level of illumination should also be comparatively high.

In searching for small blow holes and cracks the use of a light-absorbing or light-reflecting dye has also proved helpful. The dyed surface serves to increase the contrast between the flaw and the surrounding surface to such an extent that much smaller flaws can be detected. A caution in the use of sodium light is to eliminate as much light as possible from other sources so that the maximum benefit can be obtained from the monochromatic nature of the sodium light.

Success Brings Japanese Industrial Problems

A GERMAN view of the problems which Japan will have to face in the near future as a result of her plans for an East Asian Co-Prosperity Sphere is given by Dr. J. W. Reichert in *Stahl und Eisen*. The article, which calls the lack of intercommunication and transport facilities in the hinterlands the most serious obstacle to the rapid and successful exploitation of heavy industry in Japan's conquered territories, appeared in Germany March 26 and has been abstracted in the British *Iron and Coal Trades Review*.

During the first four months after Pearl Harbor, Dr. Reichert points out, Japan extended her control to an area of nearly 3,250,000 sq. miles, inhabited by 400,000,000 to 450,000,000 people, while Old Japan, excluding Formosa, Korea, Kwantung and south Sakhalin, covered an area of only 143,000 sq. miles, with a population of about 70 millions.

Transportation facilities are, of course, adequate in the coastal regions, where they have been developed for decades by Europeans. But the greater part of the Chinese massif has only the most primitive forms of transport, and even good roads are absent in vast areas. If these areas are to be developed on modern industrial lines, or even defended against invading forces, roads must be built and a comprehensive system of intercommunication provided. One phase of the transport problem is sea communications between the widely-scattered parts of the new Japanese empire. To meet the enormous demands of the war at sea against the chief maritime nations of the world and to provide shipping for normal trade operations, Japan needs a merchant navy which must be several times greater than the one she now possesses. Her shipyards are working to capacity, but Dr. Reichert considers that it will take ten years before her present tonnage is even doubled.

In 1934, the author made an analysis of the Japanese iron and steel industry and suggested that the supply of raw materials and the security of her communications with the Asian mainland, her industrial and economic mainstay, were the twin Achilles heels in Japanese plans for future hegemony in Eastern Asia, *i.e.*, in her ability to wage war successfully. He now sees the position in a different light with Japan standing astride a conquered empire, and he suggests that industrially Japan is totally unprepared to shoulder the burden of exploiting it. Her inability to expand communications to the level needed, owing to the general backwardness of existing transport facilities and the absence of a large mercantile marine, has already been mentioned above. On the industrial side, the same picture appears, for the new Japanese empire cannot be exploited without a vast army of machines, and at the moment Japan is quite incapable of building these machines in the numbers required for her large empire.

Steel Industry Expansion

No effort has been spared in the past to create a large iron and steel industry in Japan. First, many years ago, came the Godo plan, then in 1938 a five-year plan was drawn up to cover also the metallurgical industries of Manchuria and North China, under which production was to be stepped up annually to 1941. A development company to exploit the iron ore and coal resources of Manchuria was formed, and has made good progress; the Krupp Rennverfahren was introduced at several works to make sponge iron from the low-grade ores available. Steady progress was made with these plans, and increasing outputs reported up to the entry of Japan into the war. Current coal and lignite output of greater Japan is around 100 million tons per year, while iron ore output has risen year by year. Supplies of manganese ore are sufficient for the requirements of the industry, but, points out Dr. Reichert, pig iron output of Japan, Korea, Manchuria and occupied China is at present by no means of such a volume that it can possibly satisfy the ever-growing demand from the vast area which has been conquered by Japanese arms. In short, military success has outstripped industrial capacity.

In recent years iron and steel requirements of the whole so-called East Asian Co-Prosperity Sphere have been much greater than the total output of Japan, and the deficit has been covered from Europe and the United States. In 1937, China, the Netherlands East Indies, the Philippines, Indo-China, Thailand and Manchuria, excluding Japan, imported 1,700,000 tons of iron and steel, but if extensive developments under Japanese ægis are to be undertaken, current and future requirements should be much greater. The author considers that the present iron and steel industry in eastern Asia is much too small to undertake the new extensive schemes of exploitation which have to be implemented.

In 1941 the Japanese government formed the Nippon Tekko Toseikai to coordinate the whole of the iron and steel industries in Japan, Manchuria and northern China, these areas being regarded as the present industrial nucleus of the Japanese empire. The direction of the N.T.T. was placed in the hands of Hirao, a former minister and president of the Nippon Seitetsu K.K. (the Japanese steel trust), and of Kohiyama, an ex-president of the Showa Seiko K.K. (the Showa Steelworks in Manchuria). The board included government officials and leading metallurgists, including Prof. Honda, Dr. Saito and Dr. Kunichi Tawara. The functions of the N.T.T. embrace every facet of complete control of the Japanese iron and steel industry, *e.g.*, state planning of raw material supplies and distribution, expansion in iron and steel production, fixing of production quotas, control and supervision of plant and producers, fixing sales conditions and prices, etc. The first object of the N.T.T. will be the more extensive industrialization of Japan, Manchuria and northern China.

Dr. Reichert twice states that the N.T.T. early this year opened an office in Berlin "in order to maintain connections with German industrial circles." His insistence on the industrial unpreparedness of Japan to exploit her new empire and his enumeration of the difficulties coupled with his welcome to the new Berlin office, seem to imply that Japanese aggrandizement in East Asia has proceeded rather too quickly for German calculations, and that Japan could overcome her unpreparedness in the industrial and technical spheres by calling to her aid the riper experience of her more industrialized partner in Europe.

Seamless Steel Tubing

CASUAL consideration as to possible uses of seamless steel tubing in light machine tools may lead to the mistaken inference that such applications are of minor consequence. The fact is, however, that such tubing is being supplied for this purpose often in carload lots. Many cases in point are found in a review of applications made in the numerous types of machine tools produced by the Walker-Turner Co., Inc., Plainfield, N. J.

There are excellent reasons for choosing seamless steel tubing in this case. Although heavy walls are required for most of the applications, the net result is parts of light weight combined with high strength and stiffness. This is significant not alone in saving steel (especially when steel is not plentiful) but in minimizing shipping weights, which is an important consideration, especially in products finding world-wide distribution. Then there are, of course, savings in machining, as compared with the use of bar stock, and a consequent reduction in scrap losses. Although tubes with welded seams might be used in certain of the applications where wall thickness is not too great, variations in metal structure at the weld are an adverse factor. Any pin holes at the welds would detract from the finish, especially of exposed parts such as columns, which are carefully ground, not only for trueness, but as an indication of the quality of the work done.

Manufacture of Long Columns

Nearly all the tubing used is bought cut to length except that which is used for spacers, collars, etc. A premium is paid for tubing in the limits on straightness must be held closely and partly for this reason, nearly all purchases are of tubing which is rough ground on the o.d., although finish centerless grinding is done after receipt on nearly all lengths (Fig. 1). An exception is columns for heavy-duty drill presses. Those supplied with floor stands are up to 72 in. in length and have a 5/16-in. wall after finishing. They are purchased in the rough and with the usual tolerances on straightness for rough tubing. Such tubing is usually slightly bowed and centerless grinding does not remove the bow on long lengths, at least not completely, as the lack of centers permits the grind to follow the bow to some extent. Therefore it is necessary to turn the o.d. to insure the close straightness limits imposed, this work being done in a Monarch lathe with a bed 78 in. long between centers.

For this turning, the tube is

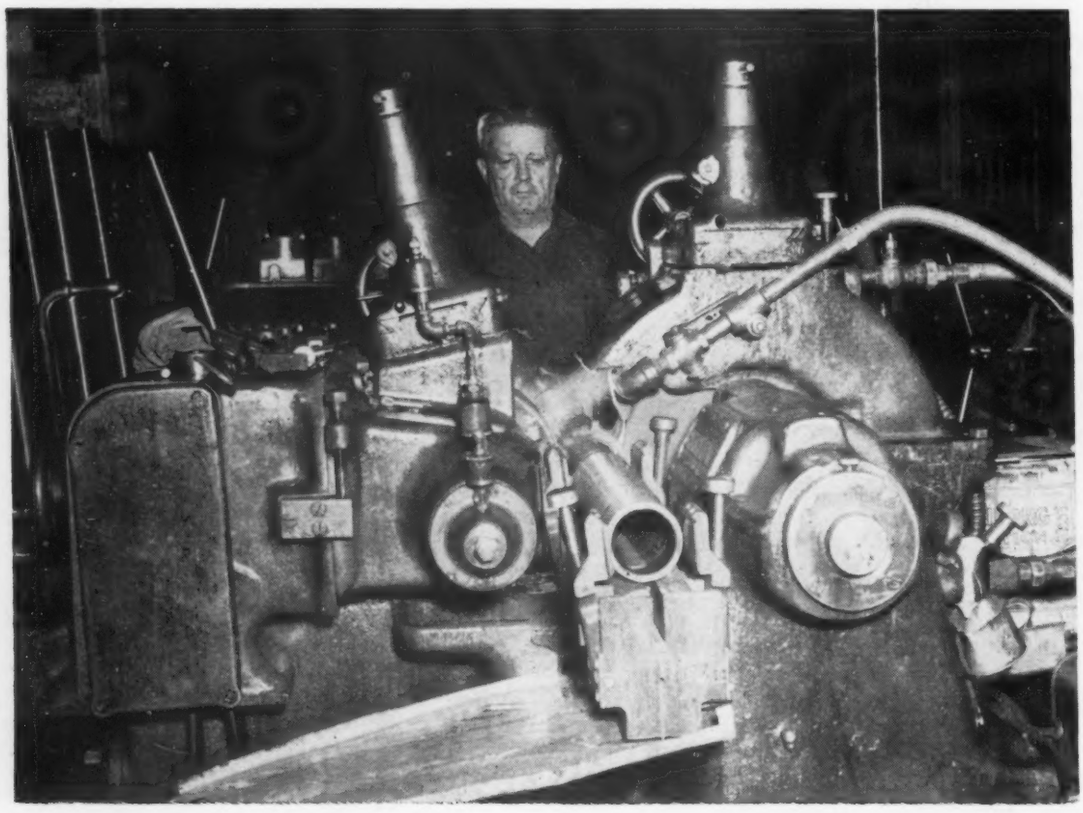


FIG. 1 — Seamless steel tubing used for columns and for other parts of Walker-Turner tools is purchased, as a rule, with ground o.d., but the latter is subsequently finish ground on a Cincinnati centerless machine as shown in this view.

in Light Machine Tools

chucked from the i.d. and a live tailstock center, equipped with double-row ball bearings, is employed, also centering, in the i.d. This set-up tends to produce a uniform wall thickness when the o.d. is turned. With the long span, it is necessary to employ a steadyrest on the carriage. This rest was first made in the conventional way, with only two bearing points on the turned surface, the tool itself forming the third point, but much difficulty was encountered in avoiding whip and chattering. Consequently, it was necessary to provide a third bearing point on the steadyrest, at the bottom, the center of its bearing surface being 205 deg. from that of the top bearing surface. This set-up, shown in Fig. 2, was effective in preventing whip and chatter. The cut is made with a carbide tool which removes an average of 3/32 in. of metal in making the cut. The work

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turns at 250 r.p.m. and the feed is 0.020 in. per revolution. Columns up to 6 ft. in length are turned and all are subsequently centerless ground within the limits of 3.748 and 3.749 in.

Spindle Sleeve Construction

Another important part of the heavy-duty drill press made from seamless steel tubing 1⅝ in. i.d. and 2 7/16 in. nominal o.d. is the spindle sleeve, the ends of which are recessed to receive the spindle ball bearings. This sleeve is 9½ in. long and is first turned with a box tool within the limits 2.379 and 2.381 in. and cut to finished length. It is then recessed on both ends in a Warner & Swasey turret lathe and slightly undercut at the end of the bores to facilitate subsequent finish boring of the bearing seats and to provide the required radii at the ends of the bores.

Next, the o.d. is centerless rough ground within the limits 2.3755 and 2.3765 in. and is then finish ground on the same Cincinnati centerless grinder to the limits 2.3738 and 2.3742 in. After this has been done, the part is transferred to a Heald Bore-Matic for boring the bearing seats within the limits shown on the drawing. These have to be held also within 0.002 in. indicator reading of concentricity with the o.d., on which latter they are held in a collet fixture while the boring is done with carbide tools, Fig. 3.

This fixture is hinged to facilitate loading and the collets are contracted on the piece by turning

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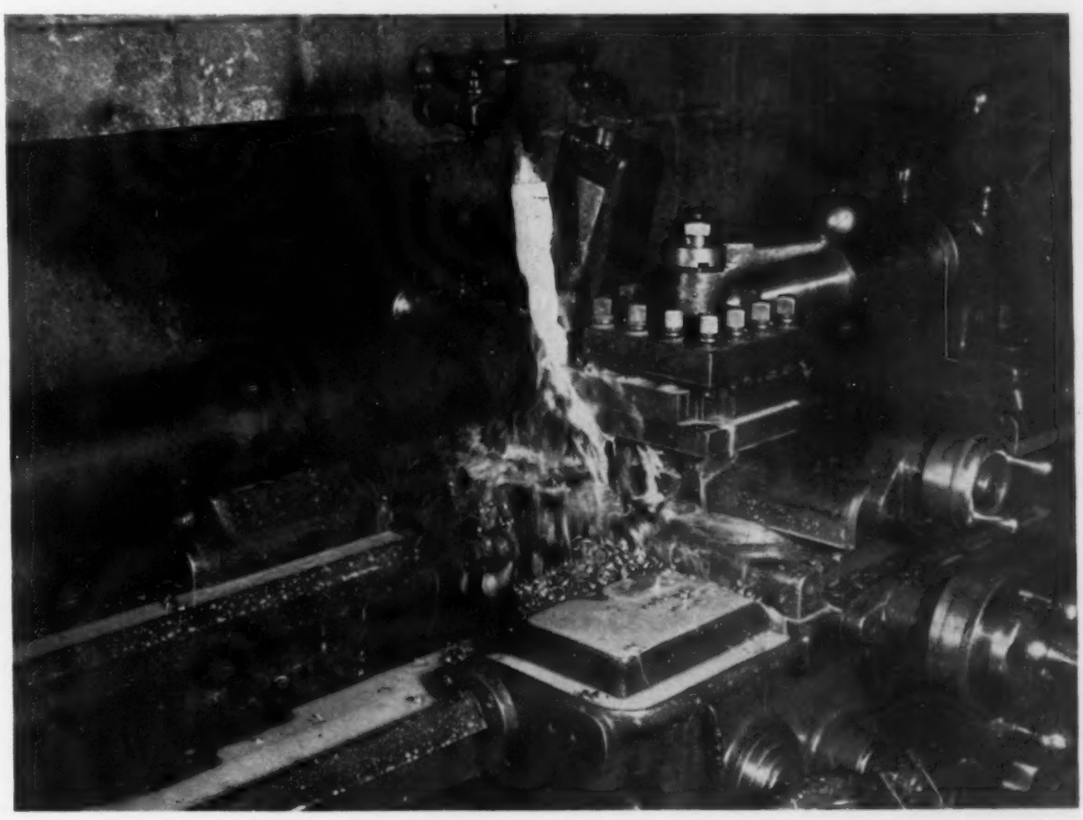

FIG. 2—Close view of the operation in which the o.d. of long tubular columns is turned on a Monarch lathe. The steadyrest employed has three bearings, the bottom one being 205 deg. apart from the top one, with the third in between. This construction avoids the chattering which sometimes occured when the usual two-bearing steadyrest was used.

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(with a spanner) threaded collars after the holder has been swung into position and fastened by a big hinged screw and wing nut. Finishing of both bearing bores is done while the piece remains in this holder, thus insuring that the two bores are concentric.

The foregoing operations complete the sleeve except for cutting rack teeth along one side. There are 29 teeth of 12-pitch and 20 deg. pressure angle, and they are cut with a gang milling cutter in a Milwaukee milling machine, Fig. 4. For this operation, the piece is held in a clamping vise on the table of the machine, the vise being equipped with hooked blocks set, of course, at right angles to

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FIG. 3—Rear view of the Heald Bore-Matic set-up, showing the operator using a spanner to contract the collets which hold the work. The hinged fixture is provided so that the holding portion can be raised while loading and unloading the piece.

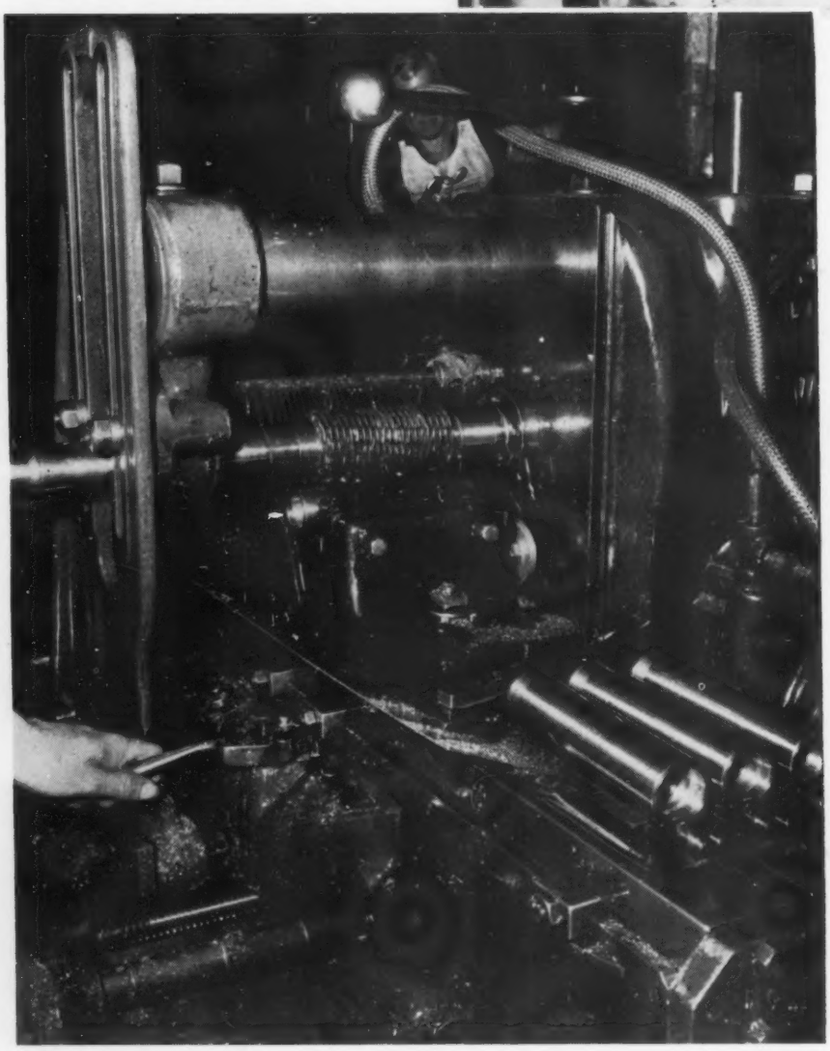

FIG. 4—Final operation on the spindle sleeve or quill, showing the latter mounted in a milling machine for milling the rack teeth with which a pinion for raising and lowering the spindle is subsequently meshed.

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the motion of the bed. All the teeth are cut in a single pass under the cutter. Use of seamless tubing for this sleeve provides the heavy wall required and avoids the waste of time and material which would be required otherwise to produce the bore. The latter, in this case, requires no finishing except for the bearing seats at the ends. Fig. 5 shows the working drawing for this sleeve. Similar sleeves or quills, also made from seamless tubing, though of smaller diameter, are employed for the lighter and smaller sizes of drill press produced in this plant.

Example of Lathe Spindle

Another part produced from seamless steel tubing is the spindle for a light lathe designed chiefly for woodworking. This spindle has a $\frac{5}{8}$-in. bore and most of the o.d. is centerless ground to the limits 0.9925 and 0.9928 in. to

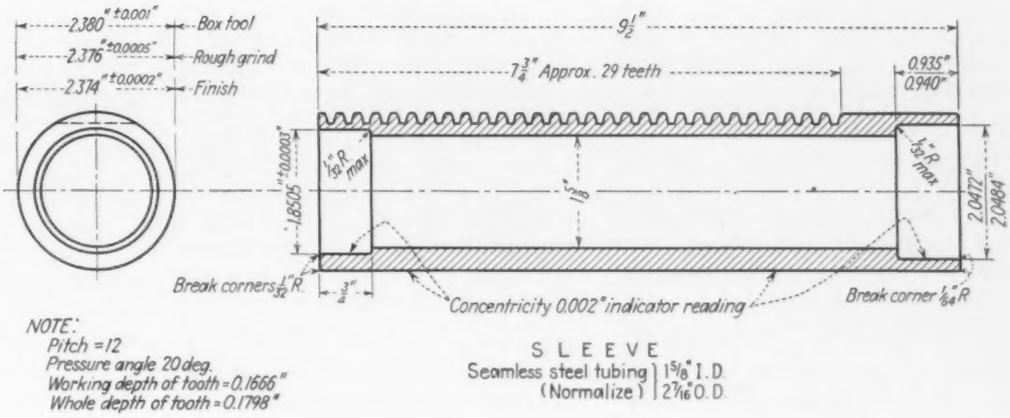

FIG. 5—Drawing of the heavy-duty drill press spindle sleeve, the machining of which, from seamless steel tubing, is described in the text.

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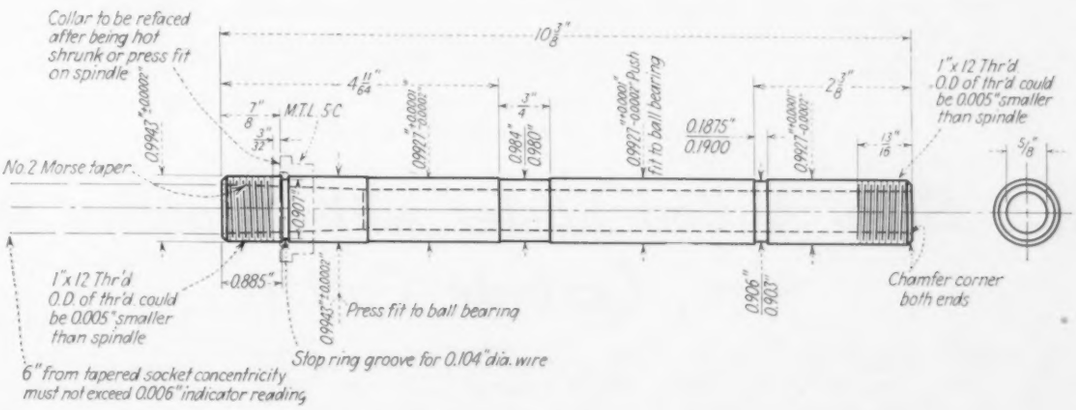

FIG. 6—Drawing of hollow spindle for a woodworking lathe which is also produced from seamless steel tubing.

fit the bore of one of the two ball bearings in which the spindle turns. The second bearing fits an o.d. held to the limits 0.9941 and 0.9945 in. Some portions of the o.d. are necked, as shown in the drawing, Fig. 6, and both ends are provided with a 1-in. x 12 standard thread. Near the inner end of one of these threads is a groove for a snap ring used to position a flange which is shrunk on. The bore of the same end is provided with a No. 2 Morse taper for a center. The thread at this end is milled in order to insure a true running thread to receive the chuck which is applied on this spindle. In order to bore the taper fit accurately, the piece is run in a turret lathe having a fixture with a bronze steady bearing fitting the 0.9943-in. diameter on which a ball bearing is later mounted.

A somewhat similar but larger hollow spindle made from seamless tubing is now being used for polishing lathes built in this plant. In effect, this spindle is a hollow shaft for the motor which drives it and is threaded on one end to receive a chuck to hold the piece to be polished. The hollow shaft is not only stiffer than a solid shaft of equal weight but because it is hollow, it permits of polishing parts, such as poppet valves,

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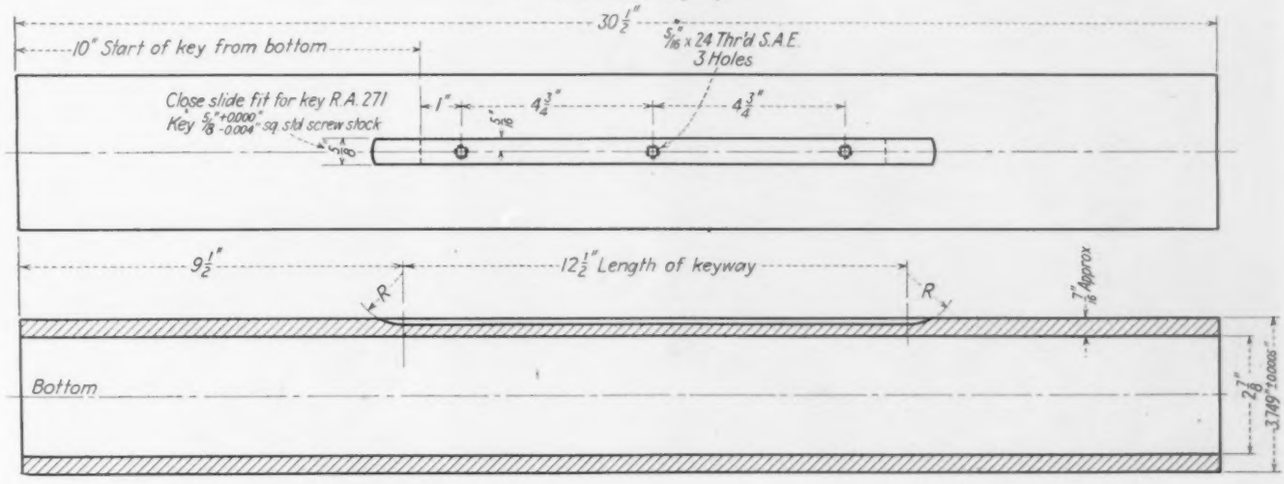
FIG. 7—Support column for radial saw produced from seamless steel tubing having a 7/16-in. wall which provides rigidity as well as sufficient stock for a keyway.



that have a long stem. This projects into the bore of the shaft when the work is held in the chuck, or in a collet, if the latter is preferred.

Radial Column

Seamless steel tubing is employed for the column of several other Walker-Turner tools besides the drill presses already mentioned, including several flexible shaft machines, mounted to turn about the tube, and a pedestal grinder in which the column fits into a tripod stand. The same construction is employed for a radial drill, used also for tapping and light profiling, and for the same basic machine designed for cut-off work and equipped (in place of a drill head) with a motor mounted in an adjustable yoke and designed to carry either an abrasive disk or a circular saw. These machine tools all have the slide support mounted at the top of the heavy seamless tube column around which the support (and its slide, carrying the head) can be turned through any desired radius within the limits of the travel provided. The column is also arranged for raising and lowering quickly to bring the tool used at the desired height above the bed.

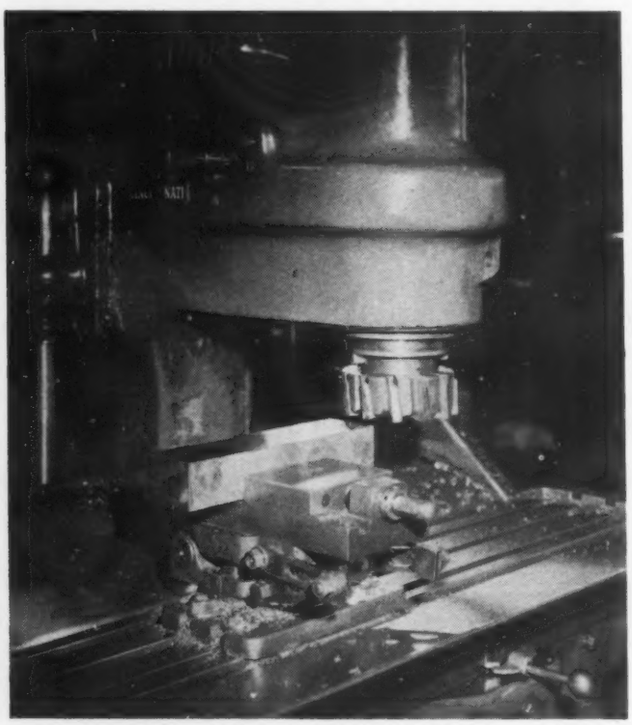
In this case, the tube employed is centerless ground to a 3.749 in. o.d. and has a 2⅞ in. i.d., Fig. 7, making for great strength and stiffness and providing a wall thick enough to receive a key by means of which the column can be locked in any required position. The only machine work needed on this column (which is quite light, despite its stiffness) is the centerless grinding of the o.d., the milling of the keyway and the drilling and tapping of holes for screws which hold the key in the slot.

Mention might be made of several other applications in which seamless tube is employed effectively in this plant, but most of these are quite similar to the foregoing applications. They make it clear that the tubing not only serves its purpose well, but contributes very definitely to economies in manufacture as well as in shipping costs.

Steel Milled Faster with Negative Rake Carbide Cutters

A NEW method of surface milling, recommended by the Firth-Sterling Steel Co., uses Firthite sintered carbide tipped inserted blades with both the rake and helix angles of the cutters ground negative up to 10 deg. The cutters operate at speeds up to 10 times those normally used with resulting feeds up to six times those of conventional high speed mills on alloy steel parts. Because of the high speed involved, the feed per tooth is less, however.

The process, known as hyper-milling, shears the metal off in place of digging it off as in conventional practice. While the usual milling cutter might be compared to a carpenter's plane which digs into the work, the new method might be compared to a carpenter's scraper in which the angle of the tool is reversed. Hyper-milling results in burnishing the surface of the work being milled and produces less tool wear.



VIEW of a hyper-milling cutter in action on annealed alloy tool steel at 419 r.p.m. with 1/16 in. depth of cut and a feed of 5¾ in. per min.

In hyper-milling, the cutting edge is greatly strengthened, as a lip angle greater than 90 deg. is used. The center of the cutting pressure is some distance behind the cutting edge. The negative angles delay cratering, pitting, wear and chipping. Without the use of any cutting fluid both the work and the cutter remain cool, resulting in a minimum of distortion, even of fragile pieces. The light feed required also results in less strain on both the work and the machine.

Using Firthite T-16 at minimum speeds of 400 ft. per min. with feed per tooth per revolution not in excess of 0.0015 in. and depth of cut not in excess of ⅛ in., production has been increased from 100 to 300 per cent on a wide range of operations.

Hyper-milling is particularly applicable to hardened, heat treated steels, including alloy steels which present difficult milling problems under conventional methods.

100-Million Volts to Extend Radiography

THE useful limits of the field of radiography which now stop at thicknesses greater than 8 in. of steel, may be extended as a result of a 100,000,000-volt "induction electron accelerator" which is now in construction at the General Electric research laboratory. This machine will give electrons energies far higher than have ever been given by any human agency before and will provide science with a new tool of unexplored capabilities.

One of the first investigations to be made with the machine will be to determine the maximum thicknesses to which X-rays can penetrate. The average industrial X-ray outfit operates on only about one million volts and has a definite limit of about 8 in. in the penetration of steel. With the new machine's increased power of 100-million volts, far greater penetration is anticipated and the maximum limit will be determinable.

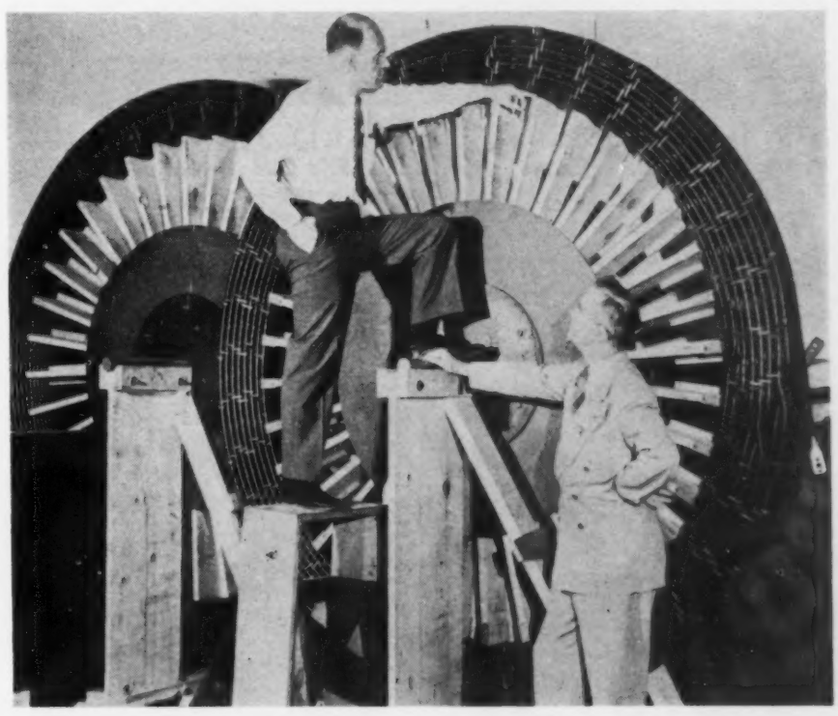
Dr. Ernest E. Charlton, head of the X-ray section of the G-E laboratory, and W. F. Westendorp have been responsible for the design and construction of the new machine using a principle originated by Dr. Donald W. Kerst of the University of Illinois with whom they collaborated in the construction of a 20-million volt machine of the same type last December.

The new machine, which is so powerful that it must be housed in concrete walls 3 ft. thick and operated by remote control while being observed through a periscope, consists mainly of a huge a.c. electro-magnet weighing 125 tons which has been built up from more than 100,000 pieces of silicon steel. At the heart of the magnet between the 78 in. diameter pole faces, where the magnetic field will be most intense, will be a 6-ft. hollow glass "doughnut" inside which the electrons will be speeded in the vacuum. Starting from an electron gun, the electrons will be whirled around in the glass vacuum tube a quarter of a million times in 1/240th of a second and on each trip receive a 400-volt push. This differs from the principle of the cyclotron, where the electrons are not continuously boosted but receive acceleration only while passing the gap between the D-shaped boxes of a d.c. magnet.

In many ways the new machine resembles a transformer in principle where the "primary" coil of the transformer is represented by two 98 in. coils and the "secondary" by the vacuum within the accelerator doughnut. The electrons which are whirling through this vacuum will be speeded-up during the first quarter of each cycle of the alternating current, which changes 60 times per sec. At the end of this quarter cycle the high-energy electrons will strike a target and generate a beam of highly penetrating X-rays.

During a discussion of the machine, Dr. Charlton told the National Inventor's Council, in part: "With the use of standard million volt X-rays we can examine large castings and we have been asked concerning the possibilities of radiographing much thicker steel pieces. The induction electron accelerator will give us the answer to this question."

DR. E. E. Charlton, right, and W. F. Westendorp examining the large coils to be used in the 100-million volt induction electron accelerator. These coils, which are actually huge a.c. magnets, are made up of nearly two tons of 0.88 in. insulated copper conductor built-up on a laminated silicon steel core containing more than 100,000 pieces of steel. The two coils shown, when completed, will weigh 125 tons.



Upset Forging With a

DEMAND for small forgings exceeds the supply available today because many conventional upsetters are running full time on shell forging contracts. The use of a butt welder to produce upset forgings is, therefore, particularly interesting, and the application is one which requires no special dies.

The machine illustrated in Fig. 1, in reality a butt-welder, is the type of unit being used for upset work, annealing, bending and separating, in addition to the more conventional operations of butt or flash welding.

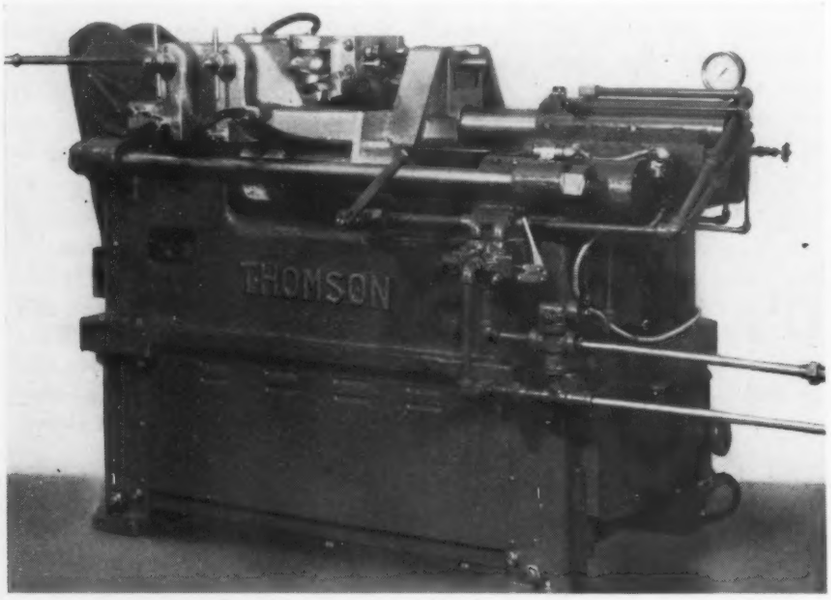


FIG. 1—Rated at 300 kva. this press welder is being used to produce upset forgings as well as for butt welding and allied jobs. It provides pressures up to 16,000 lb. per sq. in. Clamps are of the four jaw type and are hand operated.

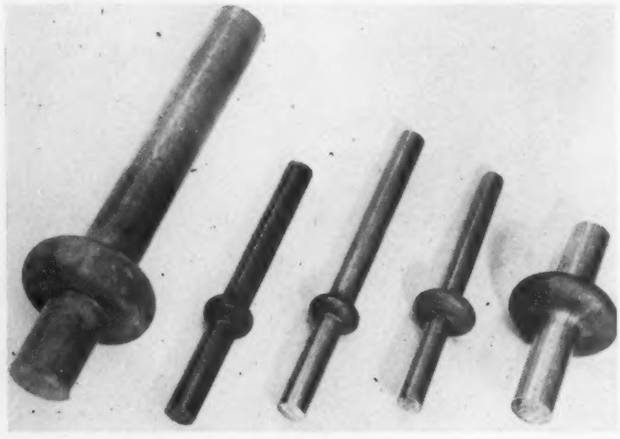


FIG. 2 — These parts in various sizes and metals are typical of the upset work produced on the Thomson machine.

Thomson-Gibb Electric Welding Co., Lynn, Mass., produces it in several sizes. A combination resistance welder and hydraulic press, it is capable of turning out a considerable variety of upset sections, some of which are illustrated in Fig. 2.

Fig. 3 shows the clamp arrangements used to produce various forms. By controlling the stroke of the clamp fixed to the hydraulic cylinder the size of the upset can be established. When one push-up of this ram does not produce a bulge of sufficient diameter or length, the clamps can be reset and the stock pushed again and again, as in diagram (2) in this illustration.

When large upsets are required in quantity, the stock is set up in the machine with one electrode clamp gripping the material adjacent to the point where the bulge is to be made. The other clamp grips the stock tightly enough to make a good electrical contact but not so tightly that it prevents the stock from forcing through it. When the current is turned on, the stock goes through the clamp slowly, forming a bulge like that in diagram (3) of Fig. 3.

Upsets may be produced at any point or points in a single length of stock—for camshafts, as an example. They may also be made by butting two short lengths of stock together, the upset being produced at the butt weld. And they may likewise be formed at the ends of the stock by using a solid block instead of one of the electrode clamps. This latter type of work (sketches (4) and (5), Fig. 3) can be done automatically in a machine that feeds the stock, cuts off and ejects after the push-up operation. Forg-

Butt Welder . . .

ing of the metal into special shapes can also be accomplished by means of dies that come up from the sides while the stock is still hot.

Materials handled include brass, bronze, monel, stainless steel and other alloys, as well as the ordinary steels. Some units are supplied with hand pumps to provide hydraulic fluid for the push-up cylinder, but self-contained pumping units are recommended for high production work. The former type is generally best adapted to the tool or repair room; the latter is designed for regular production runs, some typical examples of which are illustrated in the accompanying table.

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. . . A compact butt welder doubles as an upset forging machine, performing a much needed function at a time when most conventional upsetters are tied up on shell forging work.

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Production Data—Electrical Upset Forging

Stock	Initial Diameter, In.	Upset Diameter, In.	Energy kva.	No. of Pieces per hr.
Brass (preheated)	2½	5 1/16	250	15
Steel (not preheated)	1⅞	4 7/8	210	15
Monel (not preheated)	2¼	3 9/16	175	40

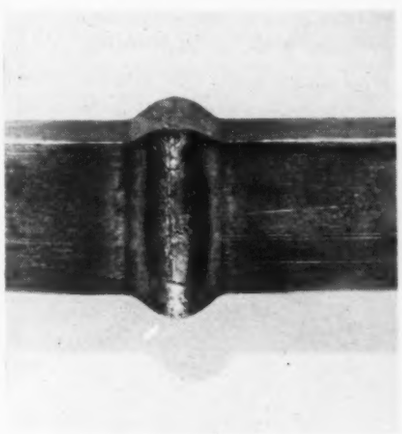

FIG. 4—Illustrative of the dual function of the machine are these closeups of a butt weld, left, and an upset forging, right.

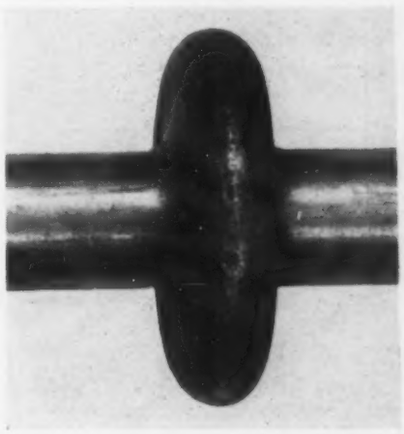

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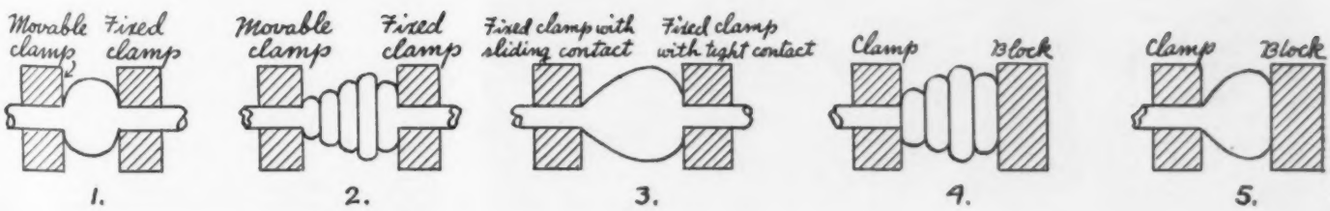
FIG. 3—Five diagrams which illustrate various upsetting operations performed by heating the metal between the jaws and successive push ups of one jaw by means of a hydraulic piston.



How to Figure Arc

TIME is the most important commodity we have today. We are all vitally concerned with using it to the best possible advantage. It is, therefore, important that we clearly understand the methods of determining time requirements of practically all our industrial operations.

This applies to metal arc welding particularly, since it is essential that the various methods of calculating welding speeds be understood if time, labor, and materials are to be properly allocated in existing plants, and if the right amount and type of equipment are to be installed in new plants.

The calculations of arc welding speeds are divided into two general classes:

A—Volumetric.

B—Linear.

Volumetric Basis

This applies to such applications as the filling in of holes of regular or irregular shape in castings or plate stock; also building-up operations.

The arc time required to complete the job can be figured by measuring the displacement of the hole to be filled and checking deposition rate in pounds per hour of electrode to be used. Deposition rate can be obtained from data furnished by the electrode manufacturer or taken from the graph (Fig. 1) which shows typical deposition rates. Welding time can then be calculated using the following formula:

$$T = \frac{V \times 0.283}{D.R.}$$

Where V = volume to be filled in cu.in.
0.283 = weight of a cu.in. of steel in lb.
$D.R.$ = deposition rate of electrode in lb./hr.
T = time in hr.

Welding speed of such jobs is usually expressed in lb./hr and therefore is the deposition rate of the electrode corresponding to the welding current used.

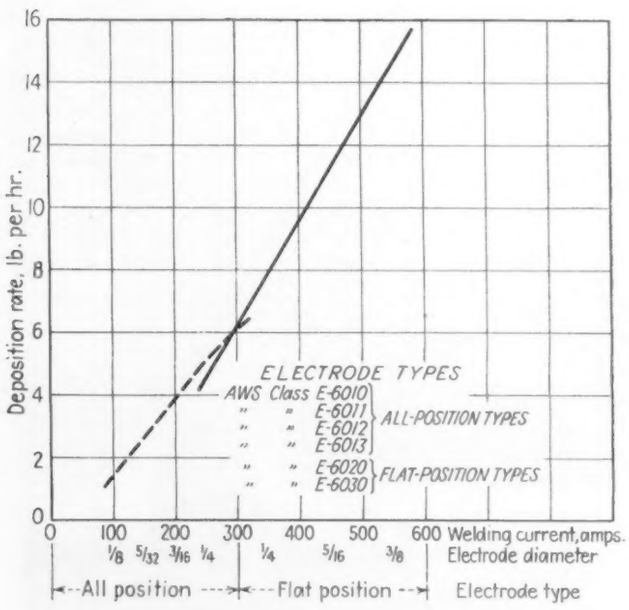


FIG. 1—This graphical analysis illustrates the deposition rate of several typical welding rods expressed in pounds per hour corresponding to the welding current used.

Linear Basis

This applies to the welding of various types of joints such as: Fillet welds, butt welds, lap welds, and corner welds.

The welding speed of such jobs is usually expressed in feet per hour and may be figured by:

1. Determining the displacement in cu.in. per linear ft. of joint to be welded and the corresponding weight of metal to be deposited. (This can be calculated or taken from charts which show such data in tabulated form.)
2. Checking deposition rate in lb./hr. of electrode to be used. (By test or obtain from electrode manufacturer. Also see Fig. 1.)

Welding speed is calculated from the formula:

$$S = \frac{D.R.}{V \times 0.283}$$

Where V = displacement in cu.in. of one ft. of joint to be welded
0.283 = weight of one cu.in. of steel in lb.
$D.R.$ = deposition rate of electrode in lb./hr.
S = welding speed in ft. per hr.

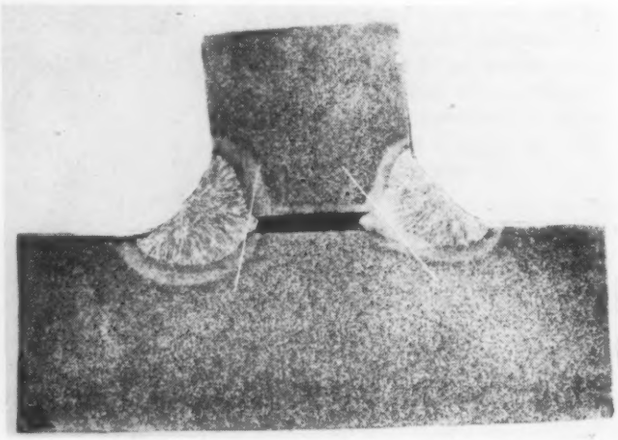


FIG. 2—Poor fit-up of the joints, such as is illustrated here, results in seepage which should be taken into consideration in figuring welding speed.

Welding Speed

By H. O. WESTENDARP, JR.
Welding Engineer, General Electric Co.

. . . The author discusses the subject from both the volumetric and linear basis and covers the determination of welding speed in building-up operations and in making fillet, butt, lap, and corner welds. The discussion of weld penetration and its effect on calculations will be found to be of particular interest.

S_l = welding speed in in. per min.

$$S_l = \frac{S}{5}$$

Adjustments to Formulas

Arc welding speed determined by the above formula is figured on the basis of 100 per cent arc time and is also based on perfect joint fit-up and exact weld size. It should, therefore, be noted that the theoretical linear welding speeds figured on the above basis should be adjusted to take into account two conditions experienced in actual production.

1. Seepage of metal under joints of fillet welds. This is a function of joint fit-up and the penetrating characteristics of the electrode used. Even joints having good fit-up permit a slight amount of seepage which should be taken into consideration in figuring actual welding speeds. When fit-up is poor (See Fig. 2), welding speed producing a given size of fillet is materially reduced due to the time required for filling the gap in the joint. This is accentuated if electrodes having deep penetrating qualities are used.

2. Convexity ratio $= \dfrac{\text{Bulge}}{\text{Theoretical fillet size}} = \dfrac{EF}{BD}$ (See Fig. 3)

The calculated welding speed is further reduced by the convexity ratio since even skilled operators can not continuously produce 100 per cent perfect fillets. A certain margin of safety is usually provided, therefore, to insure development of the proper fillet size. The factor taking this condition into account depends upon the size of fillet, the position in which the welding is done, the type of electrode used and the welding technique.

Experience under production conditions indicates that for joints

FIG. 3—Another feature of the weld bead which should be considered in figuring welding speed of fillet welds is the bulge, or convexity, illustrated as the ratio between *EF* and *BD*, or *EF/BD*.

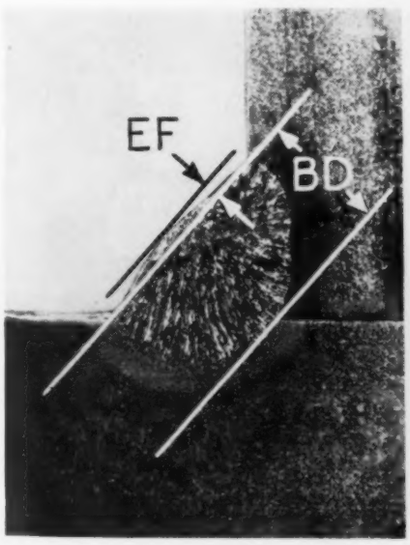
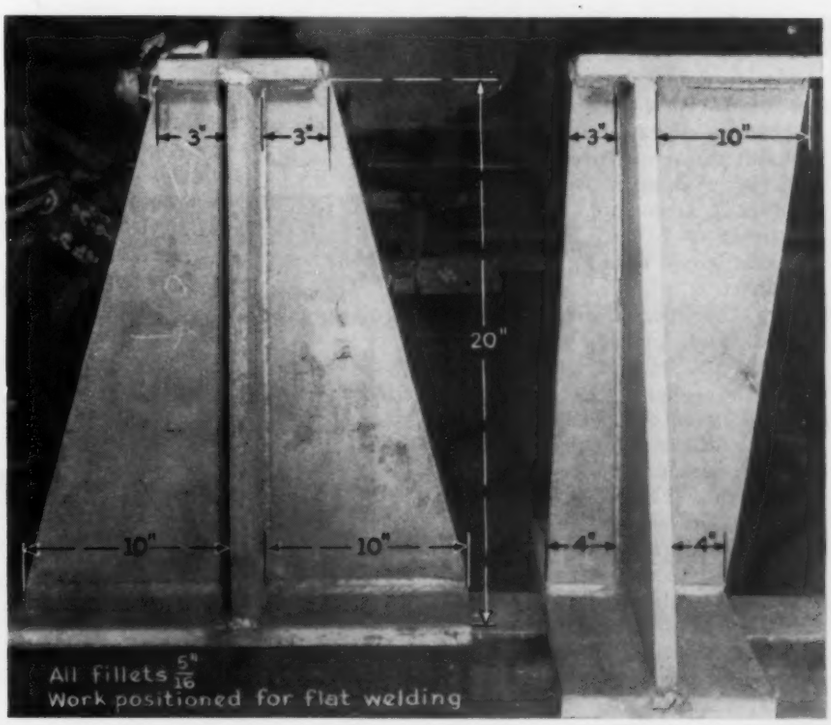


FIG. 4—This simple weldment serves as a typical example of the calculation of welding speed.



having good fit-up and on the basis of good welding technique, the following factors (reductions) should be applied to theoretical welding speeds of fillet welds:

Horizontal fillet welds, ⅜ in. and larger . . . . 10 per cent
Horizontal fillet welds less than ⅜ in. . . . . 15 per cent
Fillet welds made in flat position, all sizes . . . 10 per cent

Since an operator can make neither 100 per cent theoretical fillet size nor 20 per cent oversize continuously, the above factors represent an average result between these two limits.

Example: Fig. 4 shows a simple weldment. Work was positioned for flat welding. An A.W.S. Class E-6020, ¼ in. diameter electrode was used.

Deposition rate = 8.0 lb./hr.
Size of fillet weld = 5/16 in.
Displacement in cu.in. per linear ft. 5/16 in. fillet weld = 0.585

$$S = \frac{8.0}{0.585 \times 0.283} = 48.5 \text{ ft./hr.}$$
(Theoretical)

$$S_1 = \frac{48.5}{5} = 9.6 \text{ in. per min.}$$
(Theoretical)

Actual welding speed = 0.9 × 48.5 = 43.5 ft./hr.
Actual welding speed = 0.9 × 9.6 = 8.6 in./min.
The arc time required to complete job =

$$\frac{174 \text{ (total length all fillets in inches)}}{8.6} = 20 \text{ min.}$$

$$\text{Estimated overall time} = \frac{20 \text{ min.}}{0.50 \text{ (duty cycle)}} = 40 \text{ min.}$$

Some adjustment should also be made on welding speeds figured in accordance with the above formulas in the case of butt joints. This type of joint does not involve as great a variable as fillet welds and the practice in some shops is to allow a maximum of 10 per cent reduction in calculated welding speed for variables.

Lap and corner welds are subject to considerable variation, depending not only on the fit-up but upon the type of electrode used. Depending on the electrode's penetrating effect, which burns-down more or less of the corner of the plate stock, there is a corresponding effect on the size of weld produced and the welding speed. It is impractical to cite a factor representing the adjustment that should be made on calculated welding speeds of lap and corner joints because of the great amount of variation that can be obtained with different types of electrodes and different welding techniques.

Arc welding slide rules such as illustrated in Fig. 5 are available, which state the number of feet of various sizes of fillet and butt welds that can be produced per 100 lb. of electrode; also the pounds deposited in the joint per 100 lb. of electrode.

By using data on these slide rules and applying the following formula, welding speed can be calculated very quickly. Since the linear footages on the slide rule include adjustment for such factors as seepage under joint, and contour of fillet and butt welds, the final answer is obtained in much shorter time than would be required to calculate it without the help of the slide rule. Procedure is as follows:

1. Determine deposition rate of electrode to be used in lb./hr.
2. Read lb. deposited and ft. of fillet weld per 100 lb. of electrode from the slide rule for the particular electrode used, and for the size of fillet required.

Where S = welding speed in ft./hr.
S_1 = welding speed in in./min.

$$S = \frac{\text{Ft. of fillet weld per 100 lb. of electrodes} \times D.R.}{\text{Lb. deposited per 100 lb. of electrode}}$$

$$S_1 = \frac{S}{5}$$

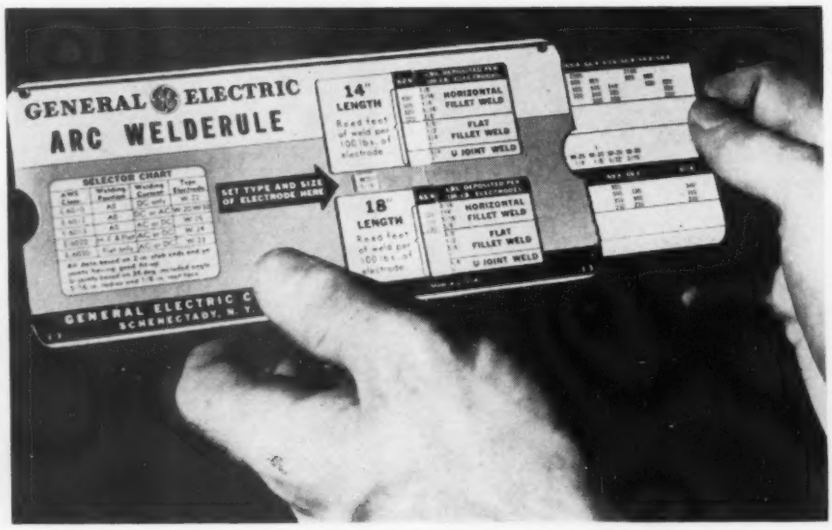
Effect of Penetration on Welding Speed

Since questions have recently arisen concerning the effect of penetration on welding speed, the following discussion of this point may be of interest. First, it should be noted that the above formulas are based solely and entirely on the deposition rate of the electrode involved and the displacement of the joint to be welded, with due allowance for seepage under the joint and for variation in size of the weld actually produced from a theoretical weld. These formulas do not in any way involve such considerations as the welding technique employed, angle of electrode, or arc length.

Penetration is defined as the depth of fusion below the surface of the base metal. It should, therefore, not be confused with the melting or deposition rate of the electrode.

Quite well recognized by welding engineers is the fact that electrodes of the A.W.S. Class E-6020 type produce penetration well beyond the corner of fillet welds when so-called "touch welding" technique is used, provided welding current, angle of electrode, and speed of travel are main-

FIG. 5—The G.E. welding slide rule quickly provides the linear footage of weld per 100 lb. of electrode including adjustment for seepage and the contour variation of fillet and butt welds.



tained at proper values and that working conditions are satisfactory (joints must be sufficiently accessible to permit the required angle of electrode).

Different types of electrodes give varying degrees of penetration. The strength of a fillet weld is determined by its throat dimension and since the actual throat of a fillet is measured from the intersection of the line of fusion with the surface of the plates to a plane parallel to the face of the weld, it is evident that penetration beyond the corner of the fillet results in added strength. (See Fig. 6). Therefore, added penetration beyond the corner of a fillet weld results in increased strength for a given size of fillet, or conversely for the same strength a smaller fillet can be used.

The leg of a fillet weld can easily be checked by suitable weld gages and, therefore, it has been common practice in the industry to determine the size of a fillet weld by gaging it and assuming that penetration went to, but not beyond, the corner. The inherent nature of penetration is such that for all practical purposes it cannot be measured on a production basis, so that whatever penetration beyond the corner of a fillet weld has been obtained has been considered as an additional factor of safety. Calculations of joint strength have been made accordingly.

Provided close supervisory control is maintained, certain applications can be figured on the basis of actual penetration obtained, and smaller fillets can be used in such cases. However, it should be noted that whereas the size of a fillet

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FIG. 6—Macrophotograph of a fillet weld illustrating that penetration is actual fusion with the base metal. It is evident that this penetration results in added strength.

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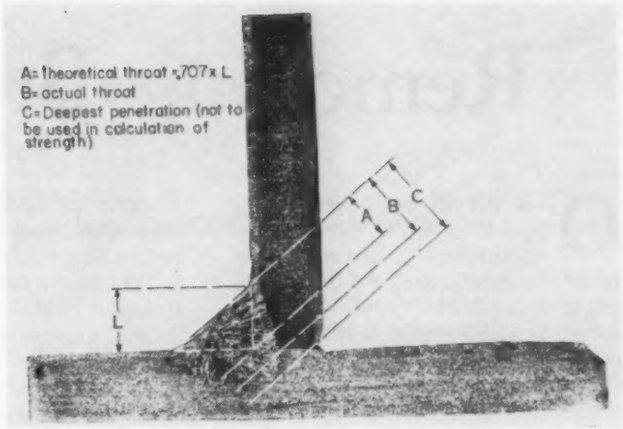


weld can be quickly checked by application of a suitable weld gage, penetration is difficult to determine. It is affected by such variables as the exact amount of welding current, the arc voltage, angle of electrode, speed of travel, fit-up of joint, temperature of plate, and magnetic disturbance. It is, therefore, necessary that the welding supervisor maintain eternal vigilance if strength of joint is going to be used on the basis that this additional penetration is continuously maintained.

$$\text{Duty Cycle} = \text{Ratio of } \frac{\text{Arc time}}{\text{Overall time}}$$

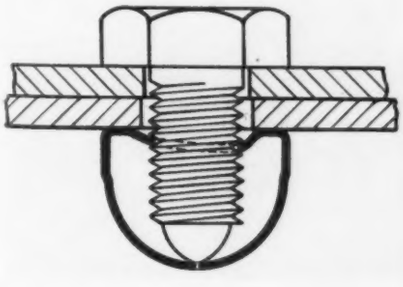
Duty cycle involves such factors as time out for changing electrodes, replenishing the supply of electrodes, and positioning of work.

As previously stated, welding speeds figured above are all based on 100 per cent arc time. It is impractical to attempt to set up formulas for overall welding speeds because the duty cycle is subject to a large number of variables such as:

Design of product
Position in which welding is done
Operator efficiency.

These and many other variables affect the amount of time the operator has to take out for other than actual welding. The following duty cycles may be used as a guide only and are subject to considerable variation, depending upon the local conditions in any particular plant.

	Per Cent
Field welding (manual)	
Building erection—	25 to 35
Shipbuilding—main assemblies—	25 to 35
Shop welding (manual)	
Heavy assembly work—	35 to 55
Straight line production work—	50 to 70
Repetitive operations—	50 to 70
Shop welding (automatic)	
Straight line repetitive production welding	50 to 75
Pressure vessel welding—	80 to 90



Acorn Lock Nut

BY extending the six sides of their standard lock nut and crowning them over at the top, an interesting design has been produced by the Palnut Co., Irvington, N. J. The new unit resembles an acorn, or rounded cap nut. These one-piece nuts are light in weight but relatively strong, and can be used to replace regular acorn nuts or nuts with lock washers. On heavier assemblies they are used to lock regular nuts. Three sizes are now available, Nos. 6-32 and 10-24, and ¼ in.-20. Acorn PALNUTS are stamped of spring steel, heat treated and plated.

Removing Broken Drills with

ONE of the most perplexing problems in modern manufacturing — the removal of broken drills, reamers, and plug gages from drilled holes—has been solved at the Pratt & Whitney Aircraft Division of United Aircraft Corp. at East Hartford, Conn. The production engineering department developed a method of making an electric arc butt-weld between a stainless steel welding rod and the broken part, and then extracting the broken part by hammer blows on a lathe dog clamped on the welding rod.

This has replaced the method formerly used of trying to drive or break out the broken part, piece by piece, with a prick punch and hammer. This method was seldom successful and frequently resulted in burred surfaces or other forms of distortion and eventual scrapping of the part. Under the new method of removal, not only are more parts being saved from the scrap pile but the time required for the salvage operation is being constantly reduced.

The scope of the work at Pratt & Whitney Aircraft covers all sections of engine crankcases, crankshafts, propeller shafts, various small parts, tools, jigs and fixtures. It is believed that the metho also can be used successfully by other manufacturers.

Through the cooperation of Presto Battery Service, and Industrial Welding Co., both of Hartford, demonstrations of a.c. and d.c. equipment were held in order to observe the action of welding equipment in the field and to determine the most practicable type available. A magnesium test block containing an assortment of drilled holes of varying depths into which plugs of steel were driven, was used to determine whether butt welds of sufficient tensile strength could be made to withstand the forces necessary to extract the steel plugs. The percentage of success in extraction from this test block was sufficient to indicate a real possibility in this method if proper technique could be developed.

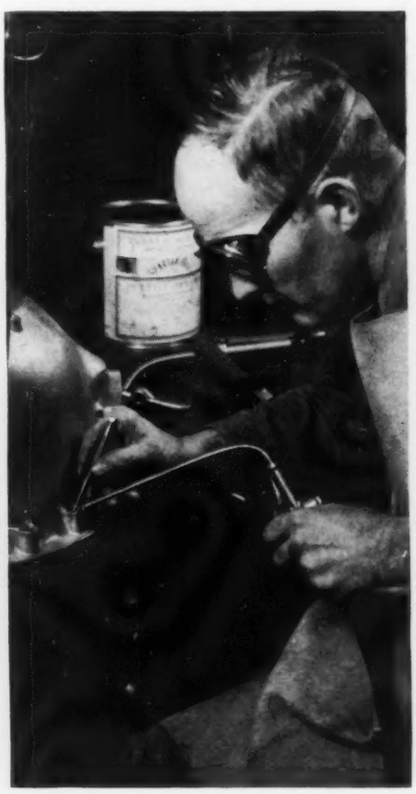
In observing the action of a.c. and d.c. welding equipment, it appeared that less arc flashing occurred with an a.c. welder than with the d.c. welder. This factor was important in that at Pratt & Whitney Aircraft most of the work involves magnesium or aluminum castings or forgings, and therefore it is advisable to avoid excessive heating or splashing of hot metal in order to preserve the heat treatment of these metals in the area of broken drills and the quality of finished surfaces.

A.C. Welder Used

A Westinghouse 250-amp. Flex-Arc transformer type arc welder was purchased, together with accessories, as illustrated in Fig. 1. The primary operates on a 220 volt, single-phase 60-cycle circuit. The tests clearly showed that the bond between the broken part and the

RIGHT

FIG. 2—First step. By using a high pressure air hose, the hole containing the broken drill is blown clear of all extraneous matter such as metal chips, oil, dirt and bits of shattered drill. The operator is shown using the blast in connection with a small prod.



BELOW

FIG. 1—The necessary equipment for removing broken drills by the welding technique described in this article is pictured here. It includes a 250-amp. transformer type arc welder, welding mask with a No. 6 colored glass, foot controlled magnetically operated switch for power supply, special universal type fixture for guiding welding rod into drilled holes in any angular position, high pressure air hose, goose-neck flash light, assortment of stainless steel welding rod, protective material for work piece and miscellaneous small tools arranged on the bench.

Arc Welding Technique

By HENRY J. BURNETT and CHARLES E. HENSLING

Pratt & Whitney Aircraft Division of United Aircraft Corp.

o o o

welding rod was strongest when the welding rod consisted of coated stainless steel. The hard flux on the outside of the stainless steel welding rods also serves effectively as an insulator especially when inserting a rod in a drilled hole where the broken drill is several inches below the opening of the hole.

In addition, a non-fuming compound, known as "Spatter-off," was obtained for protective purposes on finished surfaces. Having the consistency of medium lubricating grease, this can be spread easily in a light layer over any finished surface where protection from arc flashing is desired. When an arc flash occurs near the Spatter-off, the heat of the arc immediately causes it to harden into a non-combustible layer of protective crust. After the welding operation is completed and the broken part is extracted, this protective coating can be quickly removed, and, by degreasing the part, the original bright quality of the finished surface is restored. In specific cases, other forms of protection from the arc flash are used, such as wet asbestos powder, fiber washers or bushings, ¼ in. brass plate drilled to fit over the opening of the drilled hole (especially when the broken drill is at the surface of the hole) and other materials depending upon the requirements of the job to be done.

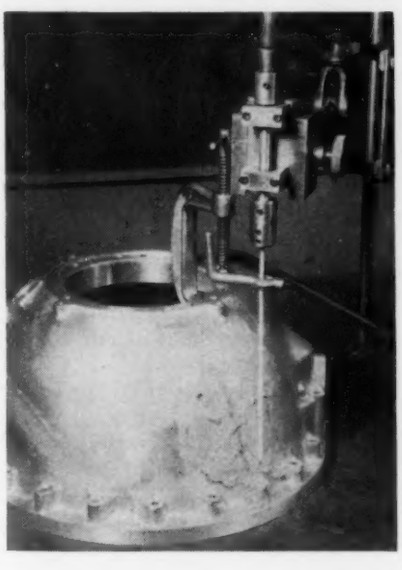
Welding Technique

Fig. 2 shows the operator preparing an engine part for the extraction of broken drill. The hole containing the broken drill is blown clear of all extraneous matter and a small prod is carefully used to remove metal chips jammed into the area between the cutting edges of the broken drill where the butt-weld is to be made. Particularly if the chips are aluminum or magnesium, it is always good practice to minimize the possibility of blow-back and unnecessary oxides in the vicinity of the welding surface due to the ignition of the chips at the moment the arc contact is made. Carbon tetrachloride also should be used to wash out any cutting oil or coolant films remaining in the vicinity of the broken tool. This is a very important feature of the cleaning process.

Fig. 3 further demonstrates the preparation of the part. Here the welding rod is already in the welding fixture, and the Spatter-off is applied to protect the finished surfaces of the part. It is good practice to round off the lower end of the rod on a grinding wheel to insure a good welding contact. Also, a lathe "dog" should be tightened on to the rod near the end which is to be inserted into the welding fix-

BELOW

FIG. 3—Here the welding rod is shown suspended in the fixture which permits vertical movement in V-guides. The workpiece itself, which is an engine part, is coated with "Spatter-off" to protect the finish of the part from welding spatter.

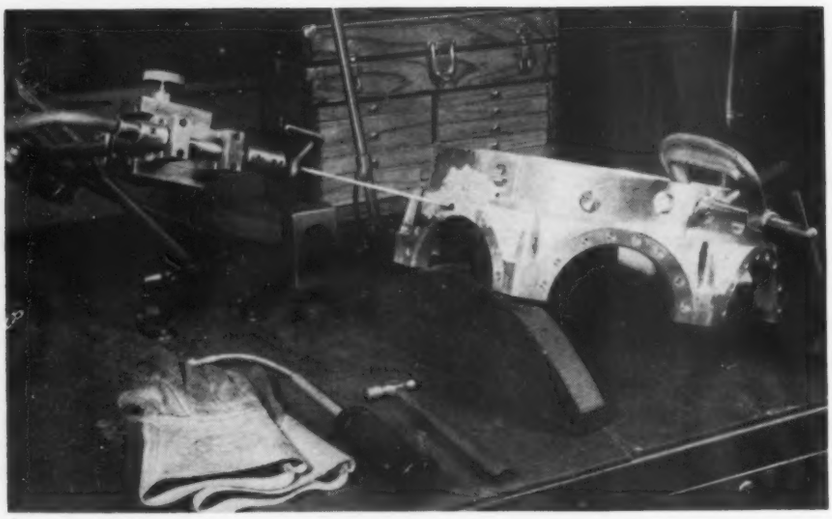


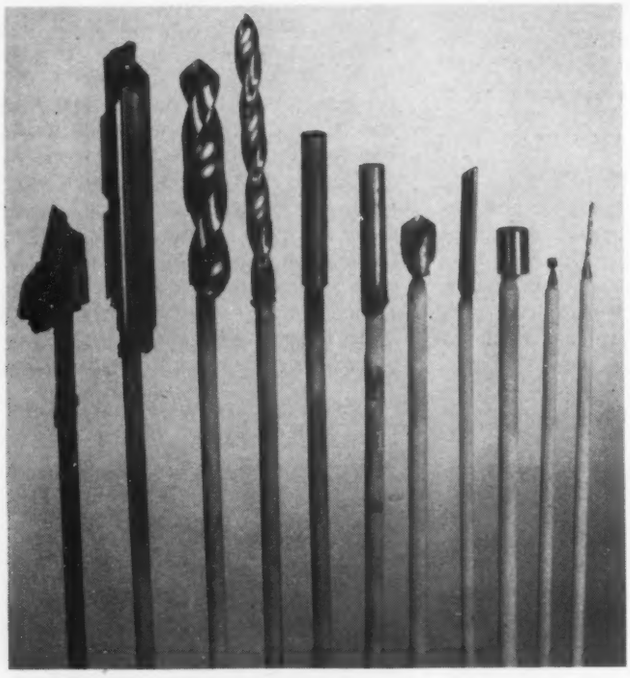
ABOVE

FIG. 4—The weld has been made and the operator is about to strike the "dog" which has been attached to the welding rod. Broken drills when jammed tightly with chips respond to hammer impacts better than they do to steady pulling. If the weld is defective, the rod will break from the drill end and rewelding will be necessary.

RIGHT

FIG. 5—This figure shows a 11/32 in. drill extracted from the hole in the bolting flange of the engine part. Complete time of removal takes only a few minutes.





ABOVE

FIG. 6—This view shows how the universal type of holding fixture permits work to be done at an angle. In this case a pilot is being extracted.

o o o

ABOVE LEFT

FIG. 7—A variety of drills, reamers and plugs removed from engine parts and machine tool fixtures by the arc welding technique.

o o o

LEFT

FIG. 8—This photograph shows the result of trying to remove a broken drill with punch and hammer. Damage to a part like this necessitates complete reworking of the hole. This can be avoided by the welding method described in the article.

ture. The dog provides a place to apply impact with a hammer after the weld is made in order to extract the broken part. Broken drills when jammed tightly with chips, etc., respond to hammer impacts better than they do to steady pulling with a tensile machine or other means.

The welding fixture shown serves a dual purpose. First, it guides the welding rod into the drilled hole in proper alinement with the centerline of the broken drill. Secondly, after the weld is made it serves to hold the rod steady when applying the extracting blows. It is particularly useful when extracting small broken parts where the diameter of the drilled hole is in the vicinity of 0.040 to $\frac{1}{8}$ inch. The welding fixture is supported by a modified heavy duty adjustable joint lighting fixture, having its tubing replaced by solid shafting for greater rigidity. An arrangement of this sort is inexpensive and serves a satisfactory purpose when properly anchored to the bench.

Test of Quality of Butt-Weld

The test of the quality of the butt-weld comes at this time of withdrawal, Fig. 4. Sometimes there are shrinkage stresses in the weld or blow holes form due to the presence of cutting oil and various oxides, thus causing the weld to break under hammer impact. In such cases it is usually necessary to re-inspect the point of contact of the stainless steel welding rod, clean the chip oxides from the drilled hole, or re-adjust the current setting of the welder to better suit the size and material of the broken drill. Frequently, too, it is discovered that the broken drill was shattered when it broke in the drilled hole. This necessitates several welding attempts before the solid part of the drill is reached. Experience shows that occasionally as many as five to ten tries have to be made before a solid part of a drill can be removed. Also this frequently happens when attempts are first made to remove the drill by pounding the part or by trying to drive it out with a prick punch.

At this point it is advisable to stress the importance of not having machine operators or set-up men make any attempts to remove any broken tool from engine parts. Frequently, a guilty feeling on the part of the operator in having to report a broken drill or reamer to his foreman is what causes the op-

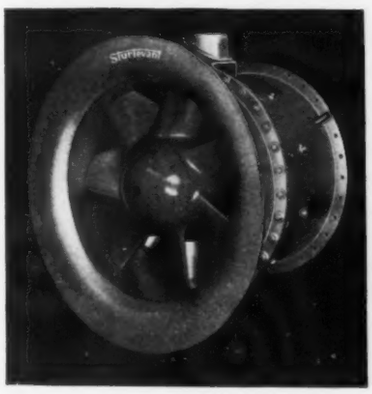
(CONTINUED ON PAGE 126)

New Equipment . . .

Plant Service Apparatus

A number of operating and maintenance accessories, as well as items adding to the safety, comfort and efficiency of workers, are described in this second section on plant service apparatus.

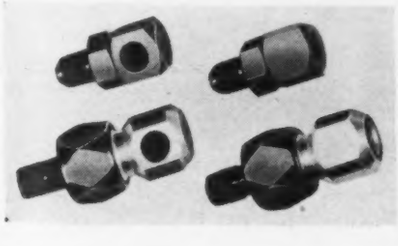
A NEWLY designed fan, constructed for quiet operation, has been announced by *B. F. Sturtevant Co.*, Boston, Mass. This new fan, which bears the name "Victory Axiflo Fan," must be restricted to the U. S. Navy for the duration of



the war. At the conclusion of the emergency it will be available to industry. Comparatively small in size and compact, this fan has a mechanical efficiency over 90 per cent. Pressure ranges for the motor-driven fan are from ½ to 6 in. of water. Turbine-driven fans range up to 60 in. gage.

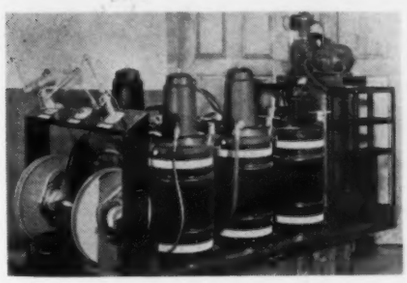
Straight and Angle Swivels

A NEW line of straight and 90 deg. angle swivels for use in making oil, grease, air and other line connections between stationary, and revolving, oscillating or other moving surfaces has been introduced by the *Trabon Engineering Corp.*, Cleveland. Standard ball bearing and light duty swivels are furnished regularly with right-hand threads in both head and stem. Swivels with left-hand threads in either the head or stem, and swivels built from corrosion resistant materials can be furnished on special order.



Portable Lubrication Station

THE Alemite Division, Stewart-Warner Corp., Chicago, announces a new portable industrial lubrication station designed for mounting on hand or electric trucks. The unit features facilities for both



high pressure and volume lubrication and handles all grades of greases, oils and slushing compounds. Long hoses give access to hard-to-reach places and permit operation by either one or several workmen simultaneously.

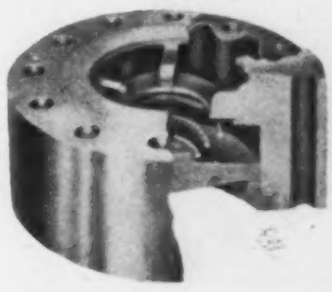
Three-Way Butterfly Valve

UNUSUALLY quick action is provided in a three-way valve of the butterfly type offered by the *R-S Products Corp.*, Philadelphia. Constructed of cast steel or cast iron, this valve is designed for mixing and quick interchange service and adapted to fully automatic control by means of an air diaphragm

motor or hydraulic cylinder. For inaccessible locations, a reach rod with de-clutching unit is provided for automatic operation or manual control in case of power failure. A special feature is the self-cleaning, double-beveled, streamlined vane, which seats wedge-tight against the body of the valve, thus producing a tight shut-off as well as positive control of volume and pressure.

Check Valves

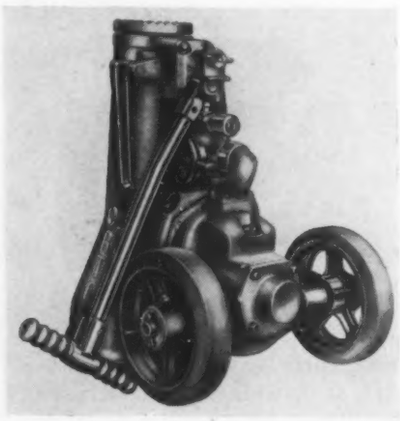
THE Williams Gauge Co., Pittsburgh, announces an improved line of check valves which are furnished in a wide variety of metals and sizes. Designated as the Williams-Hager flanged silent check valves, they are manufactured of bronze, cast iron, steel, stainless and monel metal for pressures varying from 150 to 2500 lb. to meet American Standard specifications. Sizes range from 1 to 20 in. inclu-



sive. These valves have but two parts subject to wear — the valve disk and seat. Both are easily removable and renewable, and the valve can be reseated without special tools.

Rotary Air Motor Jacks

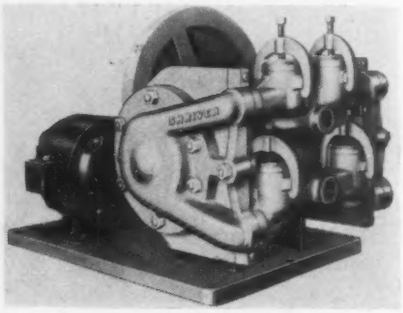
THE *Duff-Norton Mfg. Co.*, Pittsburgh, announces new designs for their rotary air motor jacks. The new motor operates 25 per cent faster with ordinary shop air pressure, yet consumes less air. Used for both raising and lowering,



the motor has a built-in exhaust muffler. An automatic shut-off cuts the motor off when the lifting standard reaches the safe limit of its raised or lowered position. These jacks have capacities from 50 to 100 tons. A 20-ton model is designed for lighter loads.

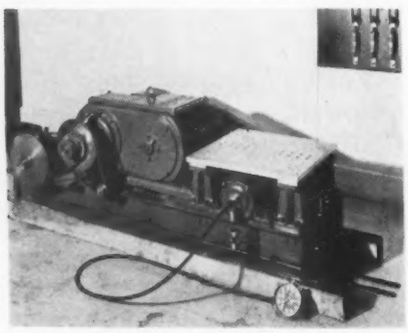
Diaphragm Pump

T. *SHRIVER & CO.*, Harrison, N. J., announces a new streamlined top feed, bottom discharge pump which is adapted particularly for handling slurries or suspensions which contain a high percentage of crystalline or quick settling solids which may be corrosive, abrasive, heavy or valuable, delicate or hazardous. Positive displacement of the material is effected by means of the double acting pistons which are always immersed in a bath of lubricating oil. An interesting feature of the pump is the interchangeability of the valve manifolds so that the pump may be fed from the bottom and discharged at the top, if desired. The pump is made in a complete range of capacities from 1 to 100 g.p.m. and for delivery pressures up to 100 lb. per sq. in. and a suction lift as high as 18 ft. Any type of motor drive may be applied.



Variable Speed Vibrator Unit

USED for testing the ability of any product to withstand vibration, this vibrator manufactured by *Walter A. Johnson Associates*, Ithaca, N. Y., is equipped with a Reeves variable speed Motodrive by which the frequency of vibration may be adjusted accurately up to 6000 cycles per min. The motion of the table is simple harmonic



in one plane, and the amplitude is adjustable from 0 to 0.0625 in. Size of table is 18 x 18½ in. and the capacity is 100 lb. at 32 *g*, more as frequency limit is reduced. The Reeves Motodrive provides automatic, infinite, stepless adjustability of frequency at the will of the operator.

Communication System

EXECUTONE, INC., 415 Lexington Avenue, New York, has incorporated its standard features in the new improved executive-monitor communication system, consisting of two or more master stations connecting up to 19 remote stations in the system. The executive and monitor stations can talk to each other, or either carry on two-way amplified voice conversations with remote desk or trumpet-type substations in outlying departments. Both executive and monitor stations are equipped with busy signals which illuminate to show

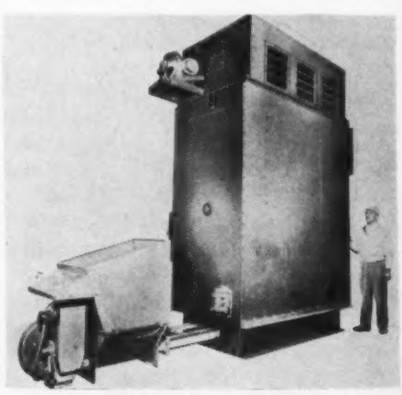
when other stations are in use. All wiring lines are connected to inconspicuous junction boxes for neat and simplified installation. Electric connection is to 110-120 volts a. c. or d. c. current. Power consumption for the entire system is only 46 watts.

Floor Resurfacer

CONCRETE floors that are disintegrating due to oils, grease and excessively wet conditions can be repaired through the use of Stonpach, developed by the *Stonehard Co.*, Philadelphia. Stonpach produces a sturdy floor, light gray in color, skid proof, easy to clean and capable of withstanding heavy traffic. No admixtures are required and no special equipment is needed for the use of this material.

Coal Fired Unit Heater

RESTRICTIONS on the use of oil and gas for fuel create a new interest in the direct fired coal burning unit heater being marketed by *Dravo Corp.*, Pittsburgh. This



heater is equipped with an underfeed stoker for either bituminous or anthracite coal and either hopper or bin feed; or for hand firing with an undergrate fan. Available in sizes from 750,000 to 4 million B. t. u. output per hour.

Wooden Lockers

THE Lockercraft Co., Canton, Ohio, announces the availability of a new series of wooden lockers in standard and special sizes. Chief advantage of their type of construction is the folding hinge design which permits easy knockdown for shipping and erection simplicity. Locker units consist of four single tier or eight double tier sections. Locking devices are optional.

Swinging Doorway Grille

A NEW swinging type doorway grille, which offers an economical device for barricading doorways without obstructing air, light, or vision, has been announced by the *Kinnear Mfg. Co.* of Columbus, Ohio. The grille proper is assembled in a heavy steel frame and equipped with steel encased cylinder lock. The assembly of steel links and 5/16 in. steel rounds affords neat appearance as well as strength. Apertures are small enough to prevent admittance of a man's hand. These grilles are furnished in any size and are of a design suited to any style of building or structure.

Plastic Window Pane

TO end the menace of flying glass, the Plastics Division of the *Monsanto Chemical Co.*, Springfield, Mass., has developed a window pane of transparent plastic laminated with wire mesh which will withstand the explosion of a 150-lb. bomb 8 ft. away. The new material consists of standard, 16-mesh wire screening sandwiched between

two sheets of Vuelite, Monsanto's transparent cellulose acetate sheeting. Sheets of the laminated plastic can be drawn or formed to almost any desired shape.

Lockers and Cabinets

SHOPROBES, lockers and cabinets, products necessary in war-time industries but eliminated by steel priorities are now offered in wood by *Lyon Metal Products, Inc.*, Aurora, Ill. Lyon portable shoprobes provide full length coat hanging space and a private locking compartment at a convenient height for each employee. The Lyon lockers have a hardwood top, bottom and frame, with sides, backs and doors of pressed wood. Tops, bottoms and frames of the cabinets are hardwood, while the backs and sides

LOCKERS

SHOPROBE
(PAT. NO. 2 202 427)

CABINET

ENGINEERED IN
WOOD
FOR THE DURATION

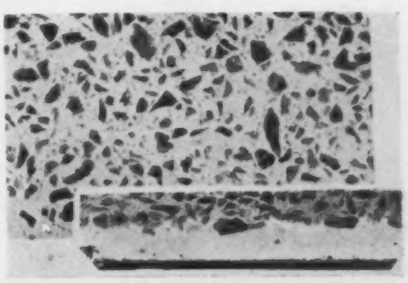
are pressed wood panels. Doors are made of two pressed wood panels mounted over a hardwood frame. All of the above units are finished inside and outside in green enamel.

Fire Extinguisher Protection

A MEANS of preventing sabotage or tampering to fire extinguishers is now offered by the *Erie Supply & Equipment Co.*, Sandusky, Ohio, in the form of an all-metal wall case known as the Tamproof box. This case encloses the extinguisher in a locked metal case which can only be opened with the lock or by breaking the seal. A handy pressure button breaks the glass seal instantly, providing immediate entrance to the extinguisher. All glass from the seal falls within the box, thereby eliminating the flying glass hazard.

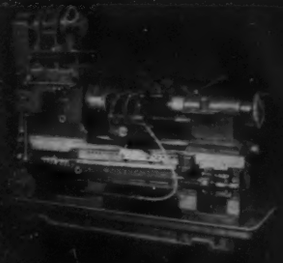
Non-Slippery Flooring

WALTER MAGUIRE CO., INC., New York, offers Cortland emery aggregate, designed to produce non-skid floors. For application, the Cortland emery aggregate is simply mixed with Portland cement and water for the floor topping. The result is a non-slip gripping surface, which becomes safer with use and affords greater pushing traction. Inset view shows compact structure of emery topping and its bond to concrete base.



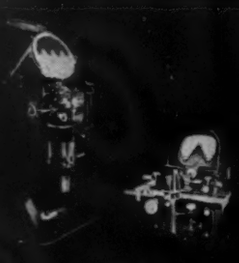
"Don't shoot, Mr. Crockett"

This country was explored, staked out, settled and defended by men with firearms in their hands. By the time of Texas independence gunsmithing had developed from the trade of the armorer into a much more specialized and refined skill. First to make guns of a degree of precision permitting the interchange of parts were the gunsmiths of the old National Hydraulic Company from which Jones & Lamson traces its industrial ancestry. These superior rifles were in great demand on the frontier and many were supplied to the "Lone Star Republic." A favorite Vermont story of the times deals with the famous frontiersman and patriot, Davy Crockett. One day, armed with his rifle, Crockett had drawn a bead on a treed coon when the coon, recognizing the famous crack shot (and perhaps even his rifle) spoke up:— "Don't shoot, Mr. Crockett, I'll come down."



FAY AUTOMATIC LATHES

AUTOMATIC THREAD GRINDERS



OPTICAL COMPARATORS

AUTOMATIC OPENING DIE HEADS

. . . I'll come down"

HERE in this community the ancient craft of shaping metal first developed modern precision. Because the times demanded better firearms this skill was promptly and earnestly applied to the rifle . . . the one indispensable tool of the pioneer.

But more was accomplished than the making of better guns . . . more was brought down than Davy Crockett's coon. This improved technique literally began the career of the modern high-grade machinist and toolmaker. And from the skill gained in making weapons of destruction came the civilizing force of modern machine tool production.

Today this skill and ingenuity plus all that science and the years can teach are devoted, not only to meeting the needs of industry in time of war, but to anticipating the country's wants in the years ahead . . . when the forces of destruction shall be made to serve the needs of peace.

Here at Jones & Lamson inquiries from large or small companies receive the careful, detailed study of our engineers. Send your questions to us now and ask for our illustrated catalogs.

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Manufacturers of Ram & Saddle Type Universal Turret Lathes . . . Fay Automatic Lathes . . . Automatic Thread Grinding Machines . . . Comparators . . . Automatic Opening Threading Dies and Chasers

Springfield, Vermont
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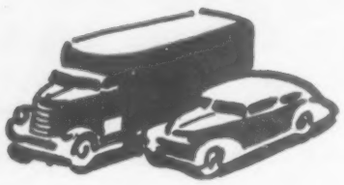
PROFIT PRODUCING
MACHINE TOOLS

SADDLE TYPE
UNIVERSAL TURRET LATHE

RAM TYPE
UNIVERSAL TURRET LATHE

Assembly Line . . .

• Automobile plants, working on war weapons, produce 25 per cent less scrap than in normal peacetime year . . . Nash sets up unique deferment department . . . WLB ignores wage differential in G-M case.



DETROIT—Except at the steel mills, there is probably no more intense appreciation of the critical scrap situation anywhere than in Detroit industrial circles. Automotive plants were major producers of scrap in the prewar days, but their arms programs do not give them nearly as much production scrap as their peace-time programs. Executives keenly realize the diminution of the flow to the mills. Their feelings have reached local newspapers, so that the drive for voluntary contributions is really in high gear here, building up toward a citywide collection later this month.

The automotive concerns, meanwhile, are themselves intensifying their scrap programs. Their volume of production scrap appears to have stabilized itself fairly well in recent months, at around 100,000 tons per month— off about 25 per cent from estimated total developed in a normal automobile output year. The only means of amplifying this flow to the mills is through accumulation of non-production scrap—old factory equipment, tools, and the like.

The Automotive Council for War Producton undertook such a program earlier this year, winning applause from the War Production Board for its concerted effort. A broad statement of policy was set up, under which most manufacturers of cars, trucks and related goods began to clear factories of obsolete equipment. Some manufacturers discarded old tools and dies almost to the brink of their 1942 model facilities, even though such equipment is ordinarily held for five to ten years against contingencies and possible use. One company is understood to have discarded some equipment used in manufacture of minor non-functonal parts of 1942 models.

Now, it is understood, the A.C.W.P. is drafting a broadened program for equipment scrapping which will go somewhat farther than did the original policy. Whether this will be made public is not yet determined but it is definitely expected to be utilized as a guidepost in forthcoming industry plans.

Meanwhile, many of the various companies in the automobile industry are understood to have made unexpected and expensive contributions to the scrap pile in recent weeks by throwing in some stocks of semi-fabricated and fabricated parts. One company's contribution of this sort was believed to be measured in hundreds of thousands of dollars.

SUCH accumulations of finished and semi-finished parts represent so-called "lifetime" stocks which are built up during the normal production runs of the automobiles. In some instances these stockpiles are produced during the earlier part of the model runs. Accumulations which came early during the 1942 model period were naturally based on expectations of production totals which were much greater than actually eventuated. Accordingly, the surplus of much parts would never be utilized and hence could be scrapped without worry as to possible need later. But substantial dollar loss is involved, providing a prime headache for industry executives.

Problems of maintaining personnel in skilled and semi-skilled occupations have been intensified in the automotive plants with the word out of Washington that occupational deferments are being tightened up and that men with dependents are facing reasonably early calls to service. The effect of such reports has been to stimulate enlistments, particularly by employees whose qualifications may entitle them to specialist grades.

ARTIST AT LATHE: Fred Shipley, well known Ohio artist (right), has turned from his canvas and murals to war production of lathes at the Lodge & Shipley Machine Tool Co. plant, Cincinnati.

Nash-Kelvinator Corp. has worked out an extremely interesting experiment to cope with the problems of deferments. So fruitful has been this experiment that Michigan Selective officials are recommending it to other plants, and it is understood that the idea has found its way to Washington, where it is under consideration.

At Lansing, Mich., where Nash-Kelvinator is actively engaged in war work, a department has been set up within the personnel office, whose function it is to handle all occupational deferment problems. This department has analyzed all operations in the plant, and the relationship of each shop to those operations. Therefore, whenever a man is about to be re-classified, the information at hand can readily be taken and applied, when justified, to seek an occupational deferment.

To make full use of this information a special insert has been drawn up by the company to accompany deferment requests made on Form 42A. This insert goes into detail

He's An 8-MAN TEAM Mr. Nelson!

HERE'S a picture to gladden the heart of Mr. Donald Nelson, Chairman of W.P.B. For it shows one man doing the work of eight. His crew—seven working spindles and one loading station of a Bullard Mult-Au-Matic.

Thousands upon thousands of these valuable tools are multiplying time-power and machine power in our giant national production push.

For firms producing planes, tanks, guns, and motor vehicles, Mult-Au-Matics mean easier changeover and easier tooling. Daily they prove their greater speed and accuracy, their unmatched versatility. Every spindle will turn, face neck, chamfer, bore, ream, drill or thread.

That's production as it's needed today. And Bullard is operating on 24-hour schedules to produce *more* Mult-Au-Matics — and then more.

THE BULLARD COMPANY
Bridgeport - - - - Connecticut

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BRIDGEPORT, CONNECTICUT

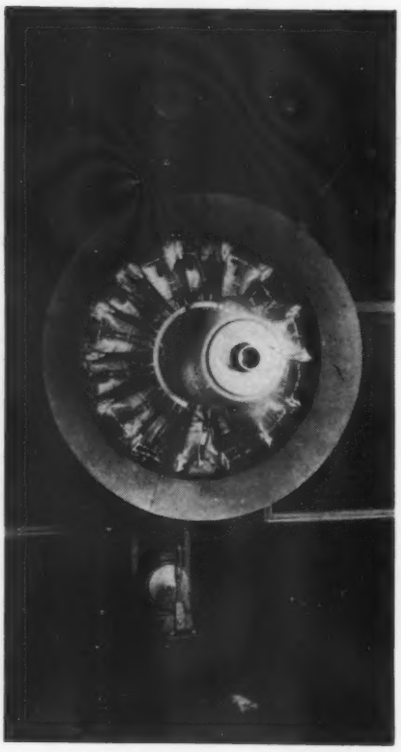
regarding the type of work being done by the plant and its importance to the war program, as exemplified by the priority ratings placed upon it. There is included a description of the occupation engaged in by the worker, planned to acquaint a draft board ignorant of technical procedure with the innate importance of the work. Then follows a fairly detailed presentation of the type of production done by the particular individual. There may be related the actual processes engaged in by the man, how many units he produces in how much time, what his pay rate is, his experience and education, and other facts which establish his importance fairly precisely. This data goes forward to the draft board.

NASH has a problem in Lansing peculiar to many companies which are operating factories for the first time in new localities. In such plants the tenure of work of employees is very often measured in months. It has been found exceedingly difficult to establish to a draft board that an employee who has worked only four or five months may be a key man in the company's scheme of things. The draft board attitude is apt to be that if a man has been at work only that short period, another man can be found to replace him satisfactorily. But this argument is broken down when it is set forth, as is done by Nash-Kelvinator, that where a man is as old as the operation in which he is engaged, he is a great deal more important than a man with the same term of working experience in a factory considerably older.

The committee which prepares these deferment requests consists of the factory superintendent, acting as chairman; the employment manager, a "front office" representative, the chief inspector of the plant involved and someone from the Detroit headquarters of the corporation who represents the Government Contact division of Nash-Kelvinator.

This office also functions as a general aid bureau to workers who are called on to fill out their questionnaires. Advice is furnished on personal problems which may be created by a call to the colors.

Such work was begun on a formal basis last April, but for many months previous it had been carried on informally. A start was made on the present program by a compilation of all information relative to the draft status of all employees. As new men are hired their situations are also entered in the general records. The department works in close liaison with shop supervision by furnishing information as to draft status of employees and possible forthcoming loss of workers holding key positions or doing skilled jobs.



IT ALL GEE-HAWS: This Pratt & Whitney aircraft engine shown in its "green test" is a composite motor made up of parts produced in two factories. In addition to testing the perfection of this particular engine, this test shows the complete interchangeability of parts which were produced under the different working conditions of separate shops and in fact separate companies. Some of the parts were made in a P&W plant, the balance under license by Chevrolet.

The automobile industry was somewhat surprised at the unusual procedure adopted by the National War Labor Board in announcing its decisions in the General Motors case.

Hitherto, the Board has always withheld its findings until the formal decision was written. In the General Motors case, however, votes were taken on the various controversial issues, the press was called in and the determinations were announced at once. One interpretation placed on this hasty behavior was that W.L.B. might be attempting to circumvent any sudden order which might freeze wages. This conclusion pointed to early decisions, probably in the same informal manner, in the Chrysler and Ford cases now before the Board.

The W.L.B. decision provided for 4c. an hour pay raise in the General Motors plants, to balance the 15 per cent rise in living costs between January, 1941, and May, 1942, it was said. Originally, an investigation panel had recommended a 5c. raise, of which 3.5c. was included to meet "the differential between General Motors and Ford." The full Board, however, did not make provision for any differential, deciding that 4c. equaled the rise in the cost of living, and that no other considerations were applicable. Elimination of differential determinants relieved Detroit. Union practice has been to use one plant's higher wages as a means of stressing demands on a second plant, and the process was endless—and, according to general industry opinion, unjustified as well.

$8 Million in Work Placed In Michigan During August

Detroit

• • • **Manufacturing** facilities for more than $8,000,000 worth of war work were located in Michigan during August by the War Production Board's regional division of field operations.

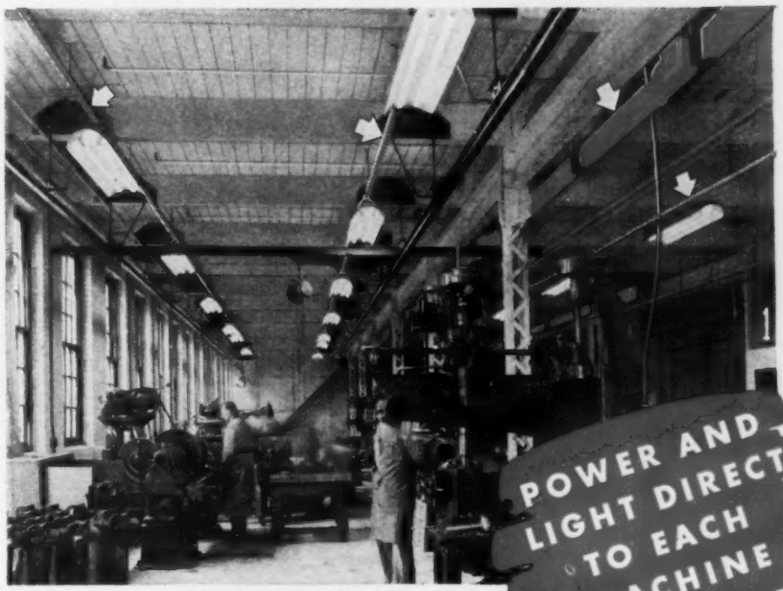
D. J. Hutchins, WPB's Detroit regional director, reported that 13 prime contractors for major war jobs were located through WPB field engineering work, and that other plants were found with available facilities to handle 225 war sub-contracts for armed services and prime contractors.

Total value of the prime contracts was $3,361,970. Dollar value of sub-contracts was in excess of $4,772,946, with contract value undisclosed in 31 of the 225 cases.

The machinery and equipment section located and arranged the transfer from one plant to another of 2,159 pieces of equipment during August. These included 1,853 small tools, 269 major machine tools and 37 pieces of miscellaneous equipment.

BEST...
WHEN "THE HEAT IS ON"

PARALLEL RUNS OF MODERN BUS DUCT FOR POWER AND LIGHT PROVE SUPERIORITY UNDER WAR PRODUCTION PRESSURE



This view in a great new ordnance plant is a fine example of how BullDog BUStribution DUCT and Universal Trol-E-Duct take power and light direct to each machine. Any machine, or a whole production line, can be quickly and easily relocated, without disturbing other machines, and with power and light instantly available.

Again and again, this war has demanded the almost impossible of American manufacturers. And again and again, they have "delivered."

It is safe to say that without modern bus duct systems for the distribution of power and light, this greatest production effort of all time could never have met its schedules.

Modern as the Machines They Serve

BullDog Plug-In Electrical Systems are used today by hundreds of the largest, most important producers of war materials, for just one reason—*they are made-to-order for this emergency;* engineered for mass production by mass production experts.

BullDog Systems have the capacity to carry peak loads "round the clock." They can be installed in a fraction of the time required for old-fashioned wiring. They are economical of critical materials. They cut maintenance time and cost.

BullDog Never Takes "Time Out"

In new plants, BullDog Bus Duct follows the roofers down the line. Machines are plugged in and go to work. Plants can be converted, machines moved, production set-ups changed, without interruption to light or power.

There is no estimating the number of man-hours, or the total of money, saved by this modern equipment — but both are enormous.

This is BullDog's contribution to the battle of production. It is one we are both proud and glad to be able to make.

NO OTHER SYSTEMS MEET THESE WARTIME NEEDS

Power and light *where* they are needed, *when* they are needed.

System can be installed in new plants without waiting for machine layout . . . machines can go to work as soon as the roof is on.

Tool set-ups can be changed, machines moved, without interrupting light or power.

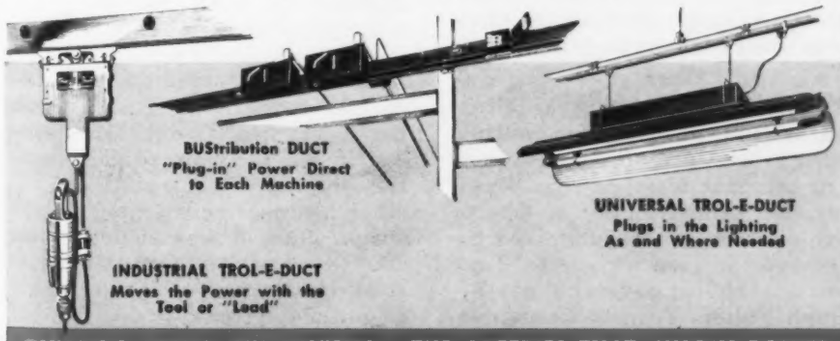
Power operates at higher efficiency, with less voltage loss, than in any other system.

An enclosed system, protected against breakdowns, sabotage and short circuits.

System is engineered for maximum efficient use of war-scarce materials. No rubber needed. Valuable aluminum saved for more critical war purposes.

Installation in fraction of time required for old-fashioned wiring.

Standard, interchangeable sections—100% salvable. Instantly convertible from one production set-up to another.


BUStribution DUCT
"Plug-in" Power Direct to Each Machine
UNIVERSAL TROL-E-DUCT
Plugs in the Lighting As and Where Needed
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Moves the Power with the Tool or "Lead"

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DETROIT, MICHIGAN

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Field Engineering Offices in All Principal Cities

BULLDOG "PLUG-IN" SYSTEMS—THE ARTERIES THAT SUPPLY POWER AND LIGHT FOR WAR PRODUCTION

Washington . . .

• Iron and Steel Branch of WPB has little control over distribution of iron and steel . . . Its officials do not want the power of strategical determination, but wish to make sure steel goes where intended.

WASHINGTON — "The main task of each branch chief will be to bring about maximum use of existing industrial capacity within the industry assigned to him for the production of war material and products for essential civilian use.

"The responsibilities of the branch chief are: To serve as a focal point for all WPB business of the industry assigned to him; to assist the industry assigned to him in every phase of his production program, including conversion, financing of new or expanded facilities, problems of labor supply and procurement of materials and equipment."

The foregoing is the substance of WPB Division Administrative Order No. 2 dated Feb. 18 setting forth the powers and jurisdiction of WPB industry branch chiefs. Under this ambiguous grant of authority, the Iron and Steel Branch functions, and with no more definite power delegation than this is held responsible in the public mind for practically every phase of iron and steel production and distribution.

The Truman Committee spent many hours quizzing Iron and Steel Branch officials about steel distribution, but the fact remains that the Iron and Steel Branch has little control over the distribution of iron and steel. This was the burden of Reese H. Taylor's testimony before the Truman Committee on Aug. 6. Mr. Taylor was former chief of the WPB Iron and Steel Branch.

MR. TAYLOR told the committee that with the exception of plate schedules which are largely controlled by the Requirements Committee, and the war agencies and the alloy allocation which in the main is controlled by the Army and Navy Munitions Board, all finished steel products are distributed under the priorities system.

Said Mr. Taylor:

"Priority ratings are assigned with the War Production Board in the following manner: Each of the industry branches, such as transportation, agriculture, and so forth, as opposed to the material branches, determines whether or not the priority application should be refused or if it should be rated and, at the same time recommend the relative essentiality of the application.

"All applications are reviewed by the materials branches, which in turn recommend a rating to be placed on the application. If the rating is higher than A-1-k the Army and Navy Munitions Board also reviews the application. The final official rating is granted by the WPB Review and Approval Section of the Priorities Division."

Now, officials of the WPB Iron and Steel Branch do not want the power of strategical determination of what steel should go to which government purposes. According to most of these officials, they merely want the power to distribute the bulk steel to the armed service users, after the strategical determination has been made by the Requirements Committee, to make sure that the steel goes where it is intendd.

THEIR complaint is just, it is believed by many high ranking officials within WPB, because they are being at least partly blamed for the maldistribution or shortage of steel by the public and by the Truman Committee. Mr. Taylor was chided several times by Hugh Fulton, Truman Committee Counsel, because he could not tell the committee just where 12,000,000 to 15,000,000 tons of steel were distributed.

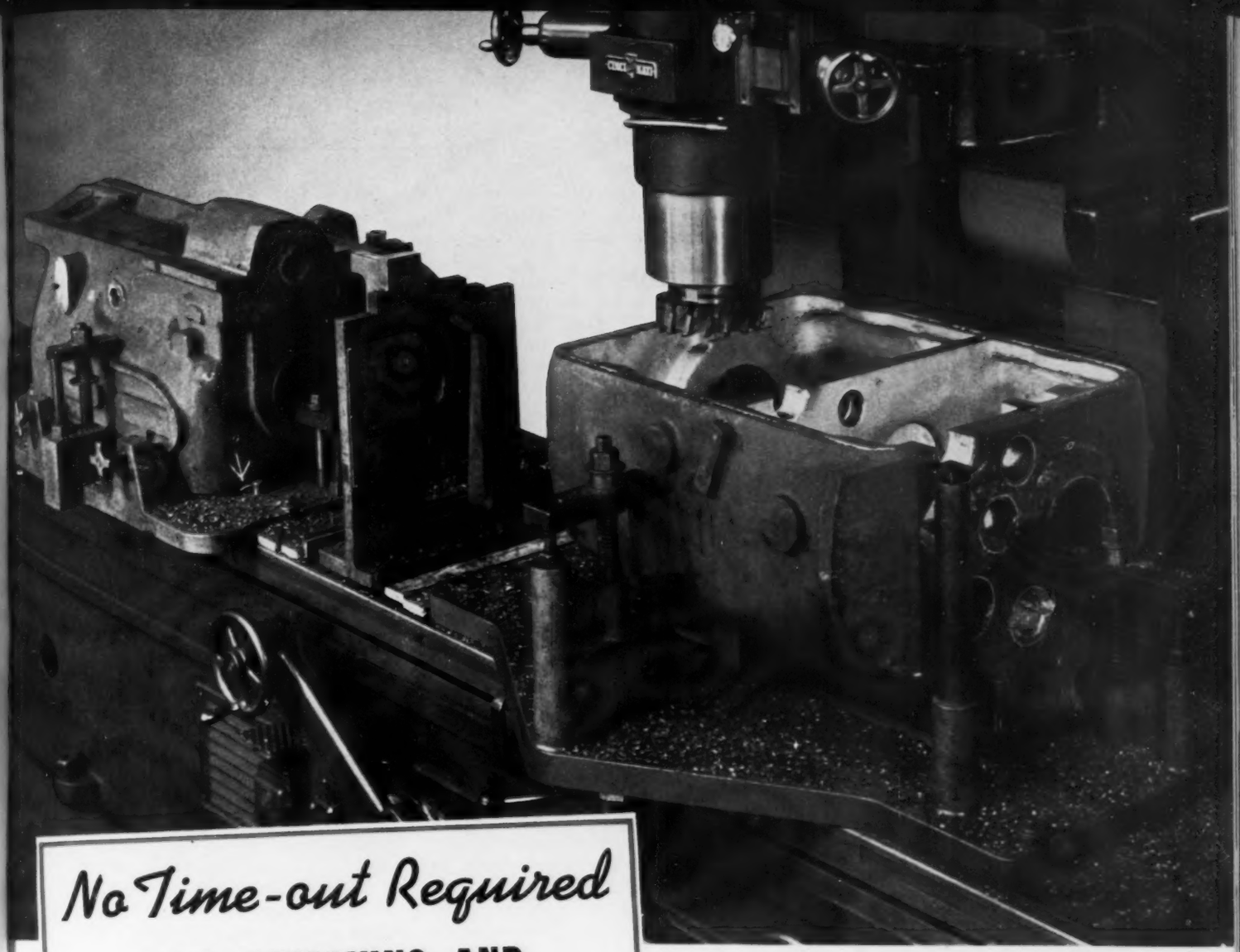
Mr. Taylor testified:

"It is apparent from the summaries of Form PD-139 submitted herewith, that approximately 50 per cent of the steel distributed in June was received by the Army, Navy and Maritime Commission. Adding lend-lease, defense projects, 'other essential exports' and warehouses, the 78 per cent of the total steel distribution is accounted for. Of the remaining 22 per cent, nearly one-third was distributed for railroad consumption, leaving only one-sixth for all other purposes enumerated previously. Thus, it was obvious that non- essential consumption of steel, if any, was of insignificant magnitude in June."

Mr. Fulton asked: "You mean that you think that 16 per cent less

Press Association photo

RUBBER CZAR: William M. Jeffers (above), is the new rubber dictator. He is president of the Union Pacific Railroad.



No Time-out Required

FOR REMOVING AND REPLACING THESE CASTINGS

CINCINNATI

● A close study of the amount of cutting time required to mill a part, compared with the time required to remove and replace it, may reveal ways and means of increasing production with little or no increase in the amount of equipment. To be complete, the study should be conducted for all the milling operations on a given part, as some of them may possibly be combined.

The headstock castings in the above illustration show what can be done in this respect. No extra equipment is required, since the table of the machine—A CINCINNATI Vertical Hydro-Tel Miller—is long enough to accommodate the fixtures for two different milling operations. While the top of the casting at the right is being milled, another casting is clamped bottom-up on the fixture at the left for the second milling operation.

In this manner, the machine is cutting continuously yet the operator has plenty of time to handle the work while the cut is progressing at the rate of 8″ per minute.

● CINCINNATI 28″ Series Vertical Hydro-Tel Milling Machines are available with 60″, 96″ and 120″ table travels. Complete specifications are contained in a new catalog, No. M-1018-1. A copy is awaiting your request.

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TOOL ROOM AND MANUFACTURING MILLING MACHINES . . . SURFACE BROACHING MACHINES . . . DIE SINKING MACHINES

whatever part of it was essential would not be a sizable sum?"

Mr. Taylor: "No, I didn't quite say that."

Mr. Fulton: "That is the way I take it."

Mr. Taylor: "It is a sizable sum."

Mr. Fulton: "You think it insignificant?"

Mr. Taylor: "Yes, but of that one-sixth there is a great deal of it that goes through three or four hands, and finally ends up in the Army or Navy, and into some war use anyway, such as certain machine tools. At the moment it is difficult to prove. It probably should be better stated that it is a reasonable assumption rather than a fact."

Mr. Fulton: "Sixteen per cent, you see, over a period of a year would be some 12,000,000 to 15,000,000 tons."

Mr. Taylor: "Which would be extremely serious if it wasn't going into direct needs. We believe it is. We are trying to find that out."

Mr. Fulton: "Yes, but you don't know how much, if any of it, is not. I just wanted to correct what I thought was your impression that there wasn't any going into unnecessary needs. But on the contrary, I think that there is."

Mr. Taylor: "There is a lot we want to know about it."

SENATOR TRUMAN on Aug. 14 spoke of steel distribution before the Senate. The Senator referred to the promise of Mr. Taylor to the Truman Committee in his testimony five weeks previously that prompt action would be taken to improve faulty distribution of steel and production "which had not been well handled."

The Senator pointed out that he believed that Mr. Taylor tried his best but said the fact is that instead of the situation being remedied, Mr. Taylor has quietly resigned without complaint, and returned to his private business. The legislator referred to the Steel Quota Plan which Mr. Taylor presented to WPB on behalf of the Iron and Steel Branch and which Mr. Taylor had mentioned to the Committee. WPB has taken no action on this plan.

The essence of the Steel Quota Plan is that the Army and Navy requirements are transmitted to the WPB Requirements Committee. After determinations have been made by the Requirements Committee and transmitted to the Iron and Steel Branch, the branch would give the armed service quotas against which they could disburse steel to the manufacturers working on war contracts. Daily advices of distribution would be submitted to the Iron and Steel Branch which would insure that this program, too, did not get out of balance. At the same time, it would provide the answer to the questions about where the nation's steel production is going.

WHAT the Iron and Steel Branch has asked for is merely authority equal to its responsibility. One wag who was formerly associated with it cracked that as things were being run at WPB, a clerk could as well be appointed to be chief of the Iron and Steel Branch, for all the real authority which was reposed in him.

The Iron and Steel Branch program for the present is stymied so far as checking up on the delivery of steel is concerned. Alternate methods are being considered to find out where steel is going, since the top policy men in the WPB frown upon the Steel Quota Plan as being out of keeping with the priority system.

The branch is trying to keep production at a high level, and is willing to approve more blast furnace or electric furnace capacity if the WPB policy makers consider it advisable.

The problem of maintenance and repair up to recently has been left largely in the hands of the steel companies, with branch approval being given to most requests for material without question. The thinking in the branch was that the companies would not ask for more materials than was necessary to preserve the most efficient operation level.

Now, however, company requests for maintenance and repair are being carefully examined, because as one Iron and Steel Branch employee put it, "There is a difference between the Tiffany standard and the Woolworth standard of maintenance and repair."

Overall control of cross-hauling is next on the branch's agenda, with an attempt to integrate schedules to prevent duplicate rolling of the same products in the same areas at the same time.

THE BULL OF THE WOODS — BY J. R. WILLIAMS

WHY, YES, THAT'S WHAT I TOLD HIM-- TO MAKE THE NEW SHAFT EXACTLY LIKE THE OLD WORN-OUT ONE!
THAT PROVES THAT EXPERIENCE IS THE BEST TEACHER--YEARS AGO TH' BULL O' TH' WOODS TOLD A GUY TO MAKE A NEW SHAFT EXACTLY LIKE THE OLD ONE--HE DID! HE MADE A PERFECT COPY, EVEN TO TH' NICKS AN' GROOVES WORN IN IT!
YEH, IF THAT YOUNG FELLER HAD THE EXPERIENCE HE WOULD HAVE TOLD TH' GUY TO MAKE TH' SHAFT EXACTLY LIKE THE OLD ONE WAS BEFORE IT GOT OLD!
J.R.WILLIAMS
SHERIDAN'S RIDE
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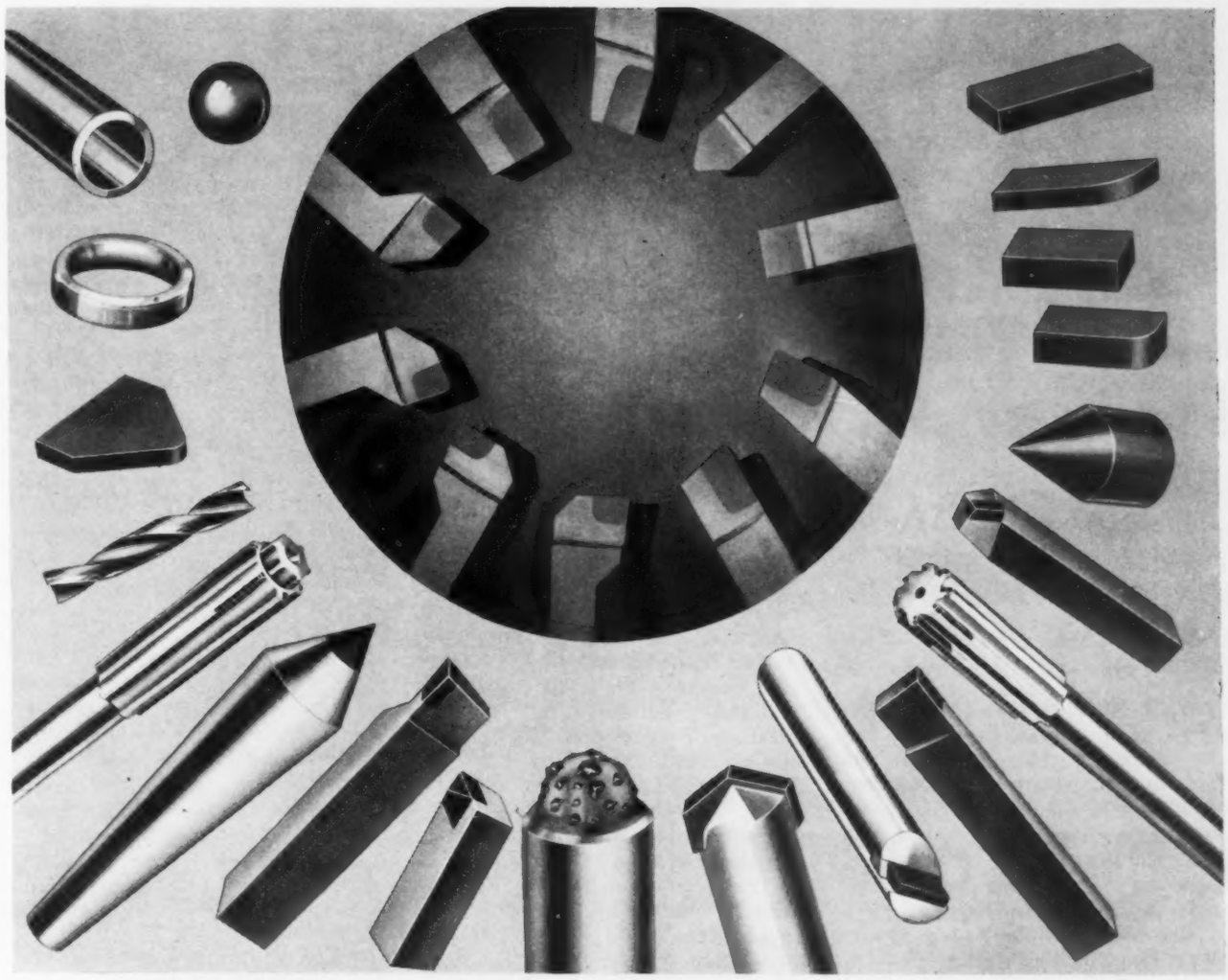

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Carboloy Company now makes available (effective Sept. 8) a large number of additional *STANDARDIZED* tools and blanks, to supplement its present standard boring, facing and turning line.

These newly standardized tools and blanks fall into two classifications as follows:

1. Standard *STOCK*. Standard stock items are those manufactured in mass production and maintained in stock for immediate requirements. With the additional standards established, over 200 separate items are now in this standard stock classification.

2. Standardized Designs. Standardized-design items, in general, are former special tool styles for which there previously has been a large demand *within a narrow range of minor design variations*. Standard designs for these have been established to broadly meet most previous requirements. You can now order these items simply by tool number and eliminate considerable time for drafting, blueprints, quotations, detailed ordering etc. Standardized design items will be added to stock as demand justifies.

A new 28-page general tool catalog, No. GT-142, contains complete prices and specifications. Copies on request.

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FOR THE MANUFACTURING · MINING · TRANSPORTATION · CONSTRUCTION INDUSTRIES

WEST COAST . . .

• Pacific area foundries speed production, playing vital but little-publicized part in record ship production . . . Steel castings double that of three years ago . . . Subcontracting revives.

SAN FRANCISCO—Lost in the welter of publicity which has celebrated the coming of age of shipyard welding and assembly technique is the very worthy news of the increased part cast metals are playing in the building of America's wartime merchant marine on the West Coast.

Record launchings have kept the West Coast yards in the production vanguard of this country's shipbuilders, and playing an important part in making it possible for these launchings to be maintained on a machine gun pace is a greatly expanded group of manufacturers making propulsive machinery.

Pacific Coast plants are turning out three 2500 hp. reciprocating engines for Maritime Commission liberty ships every two days, Carl Flesher, West Coast regional director for the Maritime Commission, told the Northern California Chapter of the American Foundrymen's Association. This pace compares with actual production of 145 Liberty ships on the Coast during the first eight months of 1942, according to Mr. Flesher. With each of these ships involving fabrication and assembly of from 3000 to 4000 tons of metal, most of it ferrous, a large part of the Coast's growth as a metal working area is summarized.

To the foundries, the important chapter in the story centers around the 135 tons of main propulsive engine, with its large quota of gray iron, cast steel, brass and bronze. Steering engines, windlasses, winches, pumps, hawse pipes, refrigerating and electric generating machinery and many lesser components all have contributed to the emergence of the industry from the job foundry chrysalis to mass production flight.

These foundries, according to Mr. Flesher, are constructing diesel propulsive and generator units designed for high piston speeds and firing pressures and having in certain designs supercharging with gas driven turbines.

PARALLELING the Liberty ship program, as the Maritime Commission director points out, is increasing production of standard cargo and passenger vessels of the C-1, C-2, C-3, and C-4 type, each having high pressure and temperature ranges in their geared-turbine and electric drives and calling for castings of extreme soundness, tensile strength and normal ductilty. These turbines and gears now are being built on this Coast.

Compared to the last war, the foundries' burden has been lessened to the extent that increasing adoption of electric arc welded fabricated pieces are replacing members previously designed for casting. The load is tossed right back to the foundrymen, Mr. Flesher frankly admits, by the "growing incapacity of modern forges and forgemen to supply all those varying and expanding parts so long peculiar to that special domain.

"In the last war we had begun to go deeply into cast steel for forging alternatives, and this was seen particularly in such ship parts as cast steel crank webs for reciprocating engines, and cast steel links for anchor chains. Much of this practice has been abandoned in the intervening period between the two major conflicts of our generation. It is, however, again being revived.

"The ever increasing demand for cast stem and stern frames, stern tubes, crank webs, turbine cylinders, valve and manifold bodies, watertight doors, winch and windlass gears, wildcats, hawse pipes and many other ship items will call for more and more load on the cast steel foundries."

Tabbed for future consideration is the possibility of making reliable cast steel line shafting. How far steel foundries have come up the hill is demonstrated by Mr. Flesher's revelation that production of steel castings is now double the record of three years ago.

For the Maritime Commission program, the gray iron foundries are turning out cylinders, columns, bedplates and attached pumps for the large steam reciprocating engines, and housings, frames and bedplates for the diesels—all of them calling for exacting technique. Reliability of work now being turned out is demonstrated by the development of the cast iron crank now used in intermediate type diesel engines. Mr. Flesher calls it "eminently reliable when made by firms possessing the necessary foundry and metallurgical technique."

NON-FERROUS metals, predominately brass, bronze and babbitt, are building an entire new Coast industry turning out bearings, telemotors, condensors, stern tube bushes, shaft liners, valves and propellers. On the Liberty ships alone, 22,500 lb. of bronze are used in each 18 ft. 6 in. diameter wheel, and each 19 ft. 6 in. diameter propeller of the tankers gobbles up approximately 35,500 lb. of bronze. That goes a long way towards explaining why WPB's conservation order on copper is among the strictest of the lot.

Experiments tried with cast steel propellers in days gone by were thwarted by rapid erosion, and cast iron propellers were dinged by rapid breakability. Lack of docking facilities in far ports to change or repair damaged wheels thus necessitates continued use of bronze no matter how much of this precious metal is required. There is a real poser for the metallurgists.

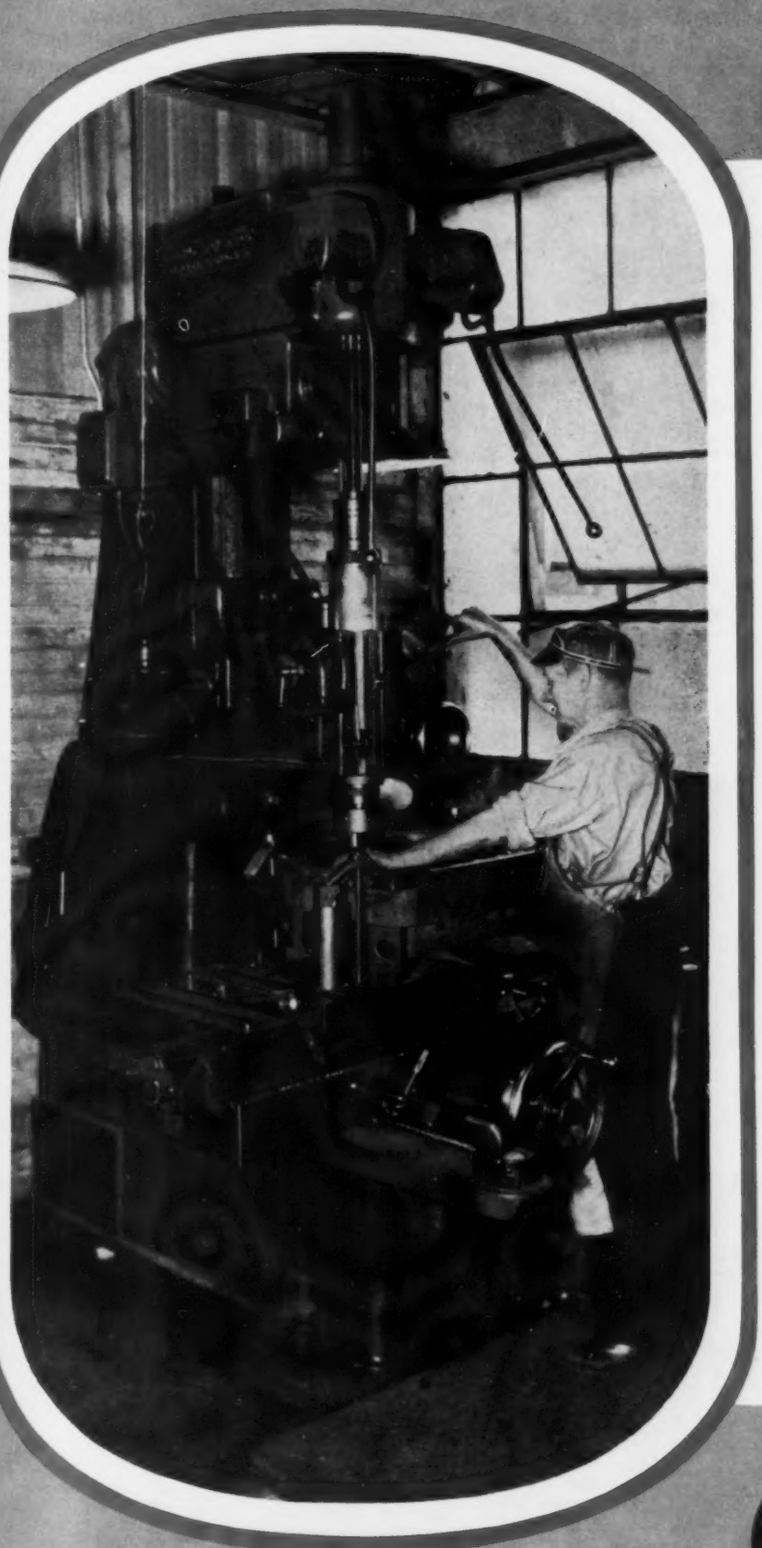
Substitutes for tin in bearing babbitts are already producing excellent results in Maritime construction.

FLESHER, who has been with the Maritime Commission for four years, directs construction for the commission in the entire pace setting Coast region. A graduate of the United States Naval Academy at Annapolis, he has spent all of his professional life before joining the commission in civilian employment, most of the time with Westinghouse working on marine installations.

Speaking on the same program was the president of what is prob-

FOSDICK

JIG BORER



makes versatility an ally of accurate production

• The ease with which this machine may be set up and changed over from one job to another is of particular interest today when job requirements demand both accuracy and versatility to meet the urgency of war production.

Simple to operate—does not require highly trained help—yet operators find it convenient and easy to produce exceptionally close tolerance work.

Fosdick Jig Borers are being used extensively in the Tool & Die Shops of America—making jigs—fixtures and special tools to speed production of badly needed war materials.

Here's a machine that has all-around utility from the tool room to the production shop and requires only a moderate investment.

If it's a Jig Borer job put it on a Fosdick — for speed — accuracy and downright economy.

ITS MANY ADVANTAGES

and mechanical details of construction are fully covered in Fosdick Jig Borer Bulletin J.B.A. Send for your copy today.

FOSDICK MACHINE TOOL COMPANY
CINCINNATI ··· OHIO

ably the least known industrial enterprise of the Kaiser-Six Companies group, the Joshua Hendy Iron Works, which is building and assembling much of the propulsive machinery referred to by Mr. Flesher. Charles E. Moore, chief executive for Hendy, is a long-time San Francisco machine tool distributor who last year went to Great Britain as advisor on machine tool requirements for the Lend-Lease program. Before the war Joshua Hendy was a sleepy little plant in the heart of California's prune and apricot growing region, employing 54 men and carring on its stooped shoulders the decadent tradition of a pioneer institution gone to seed. Under Moore's guidance, Hendy has been built up to where it now has 54 buildings, thousands of employees, and depends on 170 subcontractors to help it squeeze out production records. Like other operations in Kaiser-Six Companies group, Hendy follows the theory that no price is too high to pay for production now.

IN poor health six months ago, despite patient nursing by the old OPM, sub-contracting now is taking a new lease on life on the Coast. As long as the prime contractors were willing to sub-contract only mass production items with close tolerances, the smaller Coast machine shops were unable to accept many invitations to bid. But now, with facilities of prime contractors as fully utilized as local conditions will allow, the less specialized work is beginning to overflow into the backwoods. For example, bulkhead assemblies for a San Francisco Bay shipyard are being fabricated by a farm equipment dealer 125 miles away who takes complete responsibility for his production which is carried on in an open lot. In the Pacific Northwest, relatively small shops several hundred miles from the Coast are taking part in even direct Navy contracts.

Seriousness of the scrap shortage in the Midwest and East last week was brought home to the Pacific Coast by allocation and shipment of 4000 tons of scrap steel from a Coast Navy yard 2250 miles to a Chicago mill by rail. To prevent further burdening of transcontinental rail facilities by hauls of this type, it is informally suggested that pig iron be shipped only 1500 miles from Utah furnaces in place of scrap and that Coast scrap be allocated exclusively to local mills.

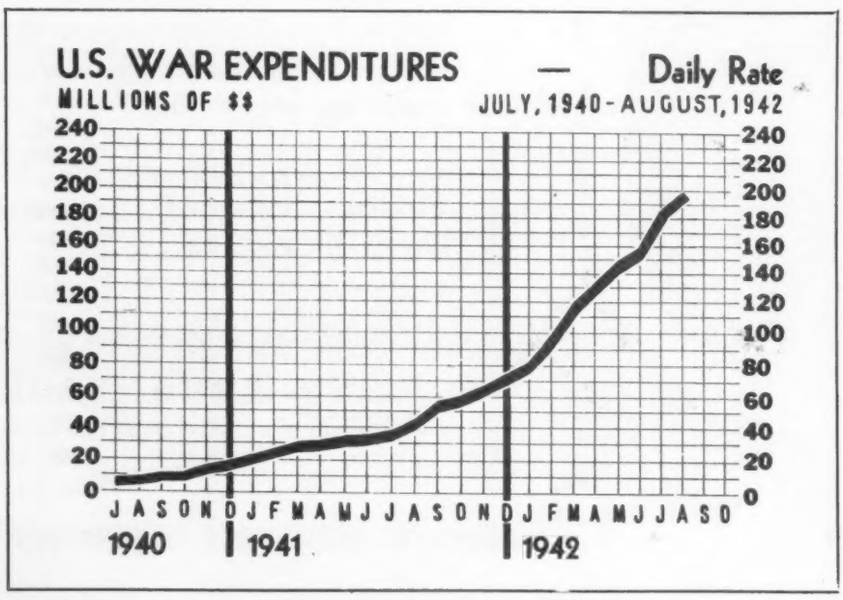
With peak shipments of grapes, perishable fruits and other agricultural products, transcontinental railroads will face their acid test during the next two months.

EASTBOUND shipments have been extremely heavy with large tonnages of Australian wool and South American ores carried from West Coast ports to Eastern centers by rail. Demand for box cars for class 1 shipments has been particularly heavy. So far, yards are clear and car shortages and delays have been only occasional and shortlived.

Pacific Coast steel warehouse stock continues to shrink. Replacements are so infrequent that dependence upon warehouses as a supply source of consequence is virtually a thing of the past. With continued inflation of priority ratings making replenishment of individual warehouse stocks a practical impossibility, some hope now is placed in working out a stock pooling arrangement.

The labor scene was relatively quiet last week with only one usual quickie work stoppage. San Francisco Bay area foundries still are unable to secure from patternmakers contract concessions providing less than double time for overtime and Saturday and Sunday work despite the executive order from the White House providing time and one-half for such work. The White House order does not become effective until Oct. 1, and the pattern makers organization refuses to make concessions before that date.

Seattle newspapers last week prominently displayed charges that shipyards there were over-staffed, a common complaint of Coast employers charging pirating of labor by the shipbuilding industry. The charges were vehemently denied by R. J. Lamont, president of Seattle-Tacoma Shipbuilding Corp.



Gun Turret Plant is Dedicated to Colin Kelly

St. Louis

• • • **The new airplane gun** turret factory of the Emerson Electric Manufacturing Co. was dedicated on Sept. 17 in memory of Capt. Colin P. Kelly, Jr., America's first hero in World War II, whose parents and sister, Miss Emmy Kelly were present.

Col. A. M. Drake, district supervisor of the Army Air Force Central Procurement Division, said the Emerson plant was built in 18 months; that every portion of it had been finished ahead of schedule, and that it was turning out products ahead of schedule on every order.

R. A. Lovett, assistant secretary of war, the principal speaker, said the war will not be won by "machines and gadgets," but by "human beings and it is going to take brains and guts and suffering to do the job."

Thomas N. Dysart, president of the St. Louis Chamber of Commerce was master of ceremonies, and W. S. Symington, president of the Emerson Electric Mfg. Co., welcomed the guests.

Save Time and steel with tools of

MO-MAX

TRADE MARK REG. U.S. PAT. OFF.

MOLYBDENUM-TUNGSTEN HIGH-SPEED STEEL

Boring Worm Gear Housing—a typical job for MO-MAX.

The urgency of the emergency demands the utmost of every man, machine and minute. To get utmost production in metal cutting, use tools made of MO-MAX. They stay sharp—20% longer between grinds than 18-4-1.

Thousands of tons of MO-MAX used during the past decade prove this steel is today's clear answer to the call for more production with less use of strategic materials. MO-MAX depends only on the U.S.A. for its moly and its less than two percent of tungsten. Its one percent of vanadium is the lowest of any commercial high speed steel.

To its high red hardness, toughness, weldability and heat treatability, add availability. Fourteen leading steel makers can supply you. They are listed on this page. Write any of them or us for complete technical data. The Cleveland Twist Drill Company, Cleveland, Ohio.

LMW . . . Allegheny Ludlum Steel Company
MOHICAN . . . Atlas Steels, Ltd.
BETHLEHEM HM . . . Bethlehem Steel Company
MO-CUT . . . Braeburn Alloy Steel Corporation
STAR MAX . . . Carpenter Steel Company
MOLITE 8 . . . Columbia Tool Steel Company
REX TMO . . . Crucible Steel Company of America
DI-MOL . . . Henry Disston & Sons, Inc.
REX TMO . . . Halcomb Steel Division Crucible Steel Company of America
MOGUL . . . Jessop Steel Company
TATMO . . . Latrobe Electric Steel Company
S.T.M. . . . Simonds Saw and Steel Company
MO-TUNG . . . Universal-Cyclops Steel Corporation
VUL-MO . . . Vulcan Crucible Steel Company

Fatigue Cracks BY A. H. DIX

Lightning Rod

• • • Although we are aware of the fact that many plants have employed the suggestion box idea for years without receiving a single earth-shaking recommendation, many others can point to instance after instance where the box has resulted in improvements that have yielded four-figure savings.

But even when the ideas received through a suggestion system are negligible in value, the system pays its way by providing a channel for the transmission of recommendations and gripes from employees to management. It acts as a ground for carrying off certain kinds of static dissatisfaction, and thereby helps keep plant morale at room temperature.

We wish the guvment would conduct a suggestion contest on a national scale, for one of the members of the brains department is burning with an idea for a second front. And we would like someone in Washington to lend a sympathetic ear to an idea of our own. It has to do with correcting a situation whereby some government departments are so grossly over-staffed that enforced idleness is producing neuroses in bumper crops, while other departments are so over-worked that stomach ulcers are cropping out like toadstools after a wet spell.

Slacks Invasion

• • • While snooping through the brains department the other day we happened upon a fat booklet issued by the U. S. Employment Service entitled "Occupations Suitable for Women." Among the 3000 or so jobs listed the ones that appeal to us most are:

Antisqueak Man
Bearingnizer
Blow-Off Man
Body Dresser
Bundler
Chill Greaser
Dimpling-Machine Operator
Dope Mixer
Fin Sticker
Frog-Leg Assembler
Hotbed Man
Merry-Go-Round Worker
Rivet Flunky
Rumble Seat Hanger
Skidder
Soft-Roll-Trv-Out Man
Spare-Tire Man
Sweater Man
Valve Sticker
Yeast Tender
Zig-Zag Machine Operator
Breast Buffer
Cabbage Salter
Cripple Worker
Foiler
Guest-History Clerk
Keep-Off Girl
Match-Up Girl
Odd-Shoe Girl
Pan Dumper
Off-Bearer
Picker-Up
Pouncing-Lathe Operator
Pretzel Twister
Soup Stirrer
Stick Pusher, Hand
Wrinkle Chaser

The job with the longest name is cream-cheese-printing-and-wrapping-machine operator. Second money goes to abrasive-wheel-friction-sawing-machine operator.

Molester

• • • War has a way of loosening grammatical tethers and of allowing words to wander into strange pastures. For instance, an automobile manufacturer writes, "*We are now indulged in ordnance shell production,*" and a machinery builder tells us, "*The priority guide is of great use. It is very conducive.*"

But the prize in our collection of neologisms is this from a South American importer:

> You were very genteel as to offer your services whenever I was in need of anything. Casually the moment has come in when I must molest you . . .

He Upped Us

• • • Years ago, when you were very young, circulation claims were not nearly as dependable as cigarette advertising. It was not at all uncommon for newspapers to give the counters on their presses a comfortable head start, as a precaution in case a nosey advertiser dropped in toward the end of a run.

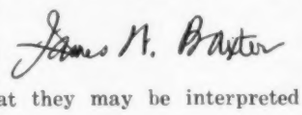
But romance departed when advertisers and some of the less imaginative of the publishers got together and formed the Audit Bureau of Circulations, which once a year makes an unsympathetic audit of circulation claims.

We will confess that we are always a little apprehensive when the auditor is poking around among our "on" and "off" figures, and our postage, printing and paper bills, and cash records. For although we are as honest as the next one, there is always the chance of a mistake. So when the auditor says goodbye, we say with Romeo—or was it the Barber of Seville?—"Parting is such sweet sorrow."

Usually we fare pretty well at the hands of the auditors. The only thing the one that just left us found wrong was our subscription renewal percentage. We claimed 80 per cent. He said it was 81 per cent. He won.

Mr. Baxter Gets a Break

• • • On several occasions we have reproduced signatures that achieve absolute zero in legibility. "Why not," writes James W. Baxter, "give us fellows (Buckeye Forging Co.) a break who are proud enough of our names that they may be interpreted without typewritten aid?"



Pride in name has little to do with it. Long before the invention of the typewriter the belief became current that the importance of the signer was in inverse ratio to the legibility of the signature. To this was added the belief that a scrawled signature is more difficult to forge than a plainly written one—a belief which, according to the American Forging Institute, is exactly counter to the truth.

The fact of the matter is, of course, that a man's signature, like his face, is no key to his character, habits, temperament, or station in life. If he likes to trace his name slowly and carefully, it simply means that he likes to trace his name slowly and carefully.

Open Letter

> Dear Mr. J. M. Hopwood, President, War Materials, Inc.
>
> In our town the auxiliary police have tied into the scrap drive. Next Saturday is scrap day, and we are asked to pile our hoard on the curb. This will help, but the home and farm scrap collecting job won't be done thoroughly until the scrap warden system is put into effect.
>
> A warden could inspect the premises, see what scrap is available, and offer suggestions. Oftentimes the owner's eye overlooks an important item simply because he has become so accustomed to seeing it in a certain place. We completely forgot about a discarded steam radiator that has been standing behind the furnace for years. If someone will help us lug it up the cellar stairs we will throw it into the pot.
>
> A block or section warden knows his neighbors. He can suggest diplomatically that the discarded gas stove that stands in the garage or the broken harrow in back of the barn has passed its useful life. He can explain that the urgency of the need for metal scrap isn't simply newspaper talk—and is not to be confused with the waste paper collection fiasco.

Puzzles

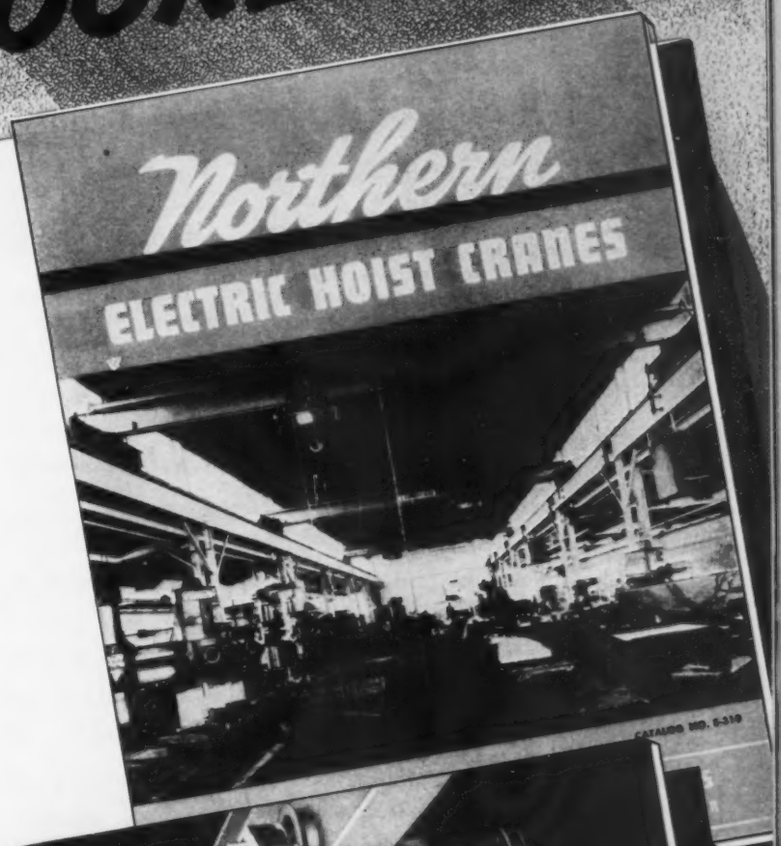
Last week's bullet strikes the ground in ½ second when fired horizontally at any velocity or dropped from a 4 ft. height.

If you can take a week off you might try this one sent in by Lt. Com. A. R. Simpson:

> *A tank having inside dimensions of 24 in. by 24 in. by 12 in. deep is filled with water to a depth of 6½ in. A copper bowl of uniform thickness, an exact hemisphere with an outside diameter of 20 in., is floated in the tank. When the bowl is in equilibrium, the bottom of the bowl is 0.227 in. from the bottom of the tank. What is the thickness of the copper of the bowl? The specific gravity of copper is 8.94.*

Send FOR THESE BOOKLETS

ON ELECTRIC HOIST AND HOIST CRANES



Electric Hoist Cranes are economical in first cost, easy to handle—are built in various capacities up to those large enough to move 15-ton loads.

They may serve as auxiliary handling equipment in connection with large overhead traveling cranes in large plants, or may move all of the material in small plants.

The Northern Hi-Lift Hoist

The essential feature of these Cranes is the Northern Hi-Lift Hoist, a modern low headroom hoist built with machine tool precision. Outstanding in design and construction, it gives maximum hook lift, assures continuous operation, provides positive control and safer handling.

The Northern Electric Hoist Crane is built in many different types, including cab or floor control.

We furnish the Crane complete, or furnish the Hoist and end trucks plus necessary accessories and drawings. In this case you can save freight by buying the girder locally.

★ *Write for copies of these books*

NORTHERN ENGINEERING WORKS

General Offices:

2707 Atwater St., DETROIT, MICH.

NORTHERN CRANE & HOIST WORKS, Limited
WINDSOR, CANADA

Offices at—44 Whitehall St., NEW YORK • 547 [illegible] Bldg., PITTSBURGH • 52 West Jackson Blvd., CHICAGO • 127 West Central Parkway, CINCINNATI • 4135 Gratiot Ave., ST. LOUIS • [illegible] South 20th St., BIRMINGHAM • 8724 Navigation Blvd., HOUSTON • 2200 University Ave., ST. PAUL

Dear Editor:

LARGE ELECTRODES

Sir:

Recently we were presented with the Army-Navy "E" Award for production. Since we feel that some of our arc welding methods materially aided us in winning this recognition we would like to pass these on to others hoping that they may help the war effort.

The use of the largest electrodes possible on each type of fabricated job is imperative if maximum production is to be obtained. For example: A ⅜-in. fillet weld on ½-in. mild steel plate, formerly welded with ¼-in. electrode at 40 ft. per hour arc time is now done with ⅜-in. electrode at 95 ft. per hour arc time. This also increased our arc time efficiency from 40 per cent to 55 per cent.

A ¼-in. fillet on 3/16-in. plate, formerly welded with 3/16-in. electrode at 8 in. per minute arc time, can be accomplished with ¼-in. rod at 14 in. per minute arc time.

By proper handling of the electrode, these larger sizes give excellent results even though the first attempts often appear discouraging.

R. V. PROCTOR,
Vice-Pres. & Gen. Mgr.
The Commercial Shearing & Stamping Co., Youngstown, Ohio

CEILING PRICE BOOKLET

Sir:

In your March 19 "Fatigue Cracks" page headed "He Lay Awake Nights," you mention a price pamphlet giving the OPA ceiling prices on commodities.

Is it still available? If so, what price?

J. H. SMITH,
Procurement Manager
Cramp Shipbuilding Co., Philadelphia, Pa.

• **(1) Yes; (2) 25c. in stamps.—Ed.**

ATOMIC HYDROGEN WELDING

Sir:

The September 3, 1942 issue of IRON AGE contains an article on Tool Conservation. We would appreciate receiving information as to who is manufacturing the Atomic Hydrogen Welding Equipment.

E. K. FASSNACHT,
Supt. Machine Shop
Braeburn Alloy Steel Corp., Braeburn, Pa.

• **General Electric Co., Schenectady, N. Y.—Ed.**

HIGLEY MACHINE

Sir:

Can you give us the address of the Higley Machine Co.?

ROCKAWAY ROLLING MILL
Rockaway, New Jersey

• **Higley Machine Co. was taken over by Porter McLeod Machine Tool Co., Inc., Hatfield, Mass.—Ed.**

FOOLPROOF GAGING

Sir:

Can you supply us with four reprints of the Sept. 3 article, "Foolproof Gaging Systems?"

PURCHASING AGENT
International Silver Co., Meriden, Conn.

• **Mailed.—Ed.**

METAL SPINNING

Sir:

Would it be possible to get the articles on metal spinning which appeared in these issues: November 21, 1940, January 30, 1941 and July 16, 1941?

W. G. MILLER
Westinghouse Elec. & Mfg. Co., Canton, Ohio

• **Yes. Mailed.—Ed.**

POROUS CASTINGS

Sir:

Please send us any literature you may have on reclaiming porous castings.

An article on this subject ran in the April 2, 1942 issue of THE IRON AGE. We would appreciate any further information you may have on this subject.

R. S. GAY
East Akron Casting Co., Akron, Ohio

• **See also page 5 of the Aug. 21, 1941 issue for article, "Salvaging Porous Pressure Castings."—Ed.**

WAGE INCENTIVES

Sir:

I would appreciate copy of your publication, "Lincoln Electric Wage Incentive Plan Explained."

J. I. ROSE,
Asst. Secy.
O'Sullivan Rubber Co., Inc., Winchester, Va.

• **See page 102, June 25, 1942 issue. —Ed.**

GALVANIZED SCRAP

Sir:

On page 57, issue of July 23, was an article and picture "galvanized scrap burned."

The writer thought this would be of interest to E. I. du Pont de Nemours Co., Wilmington, Del., Grasselli Chemicals Dept., and referred it to V. R. Daub, Metal and Ore Division.

We have a contract with this division and sell them all of our galvanized sheet metal scrap and have done so for many years past, and we are enclosing herewith a copy of reply we received under date of August 10 which may be of interest.

We might also add our dealings have been pleasant and profitable through all the years that we have done business with them. They have a plant at Weirton, W. Va., where all this sheet metal scrap that we ship them is handled.

JOSEPH P. CRANSTON,
Vice-President
James Mfg. Co., Fort Atkinson, Wis.

Dear Mr. Cranston:

We have received your letter of Aug. 6, enclosing item appearing in THE IRON AGE, subject "Galvanized Scrap Burned." We noticed the same article and immediately took up with the concern mentioned the question of discontinuing this practice and shipping their material to us at Weirton. We quite agree with you that this is a very crude method and this practice should be discontinued, particularly in view of the fact that it is a definite waste of zinc, which is very badly needed at the present time.

V. R. DAUB
E. I. DuPont DeNemours Co. Inc., Weirton, West Virginia

TOOL STEELS

Sir:

We learned that you publish a printed sheet known as "Chart of Comparable Tool Steel Grades." Also a small booklet entitled "Directory of Tool Steels."

This information will be of considerable help in a study of tool steels which we are now making.

Will you please forward one copy of each of these two publications?

R. H. DALGLEISH, JR.,
Research Engineer
Philadelphia Transportation Co., Philadelphia, Pa.

• **Mailed. Please send 25c. in stamps for the Tool Steel Directory and 15c. for the chart.—Ed.**

BOUQUET, HARD-CASED

Sir:

My compliments upon the excellent article on Hardenability by Dr. A. E. Focke in THE IRON AGE of Aug. 20, 27 and Sept. 3. Do you have a reprint? We are preserving our volumes of THE IRON AGE in bound copies and dislike to tear out this copy which will be used extensively for reference purposes by members of our staff.

B. F. SHEPHERD,
Chief Metallurgist
Ingersoll-Rand Co., Phillipsburg, N. J.

• **Reprints have been made. Copy is being mailed.—Ed.**

GRAY IRON DEFECTS CHART

Sir:

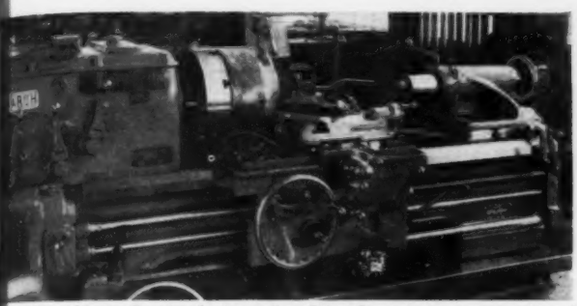
Our foundry superintendent and foremen wish to obtain a copy of the tabulation of "Causes of Gray Iron Casting Defects," which appeared in THE IRON AGE of Sept. 5, 1940.

M. W. EAMES
Harrison Radiator Division, General Motors Corp., Lockport, New York

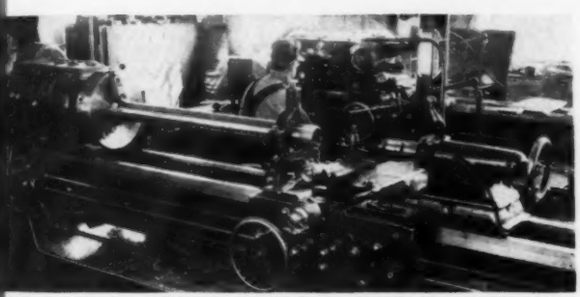
• **Mailed. Please send 15c. in stamps. —Ed.**

TEAMWORK does the job at York, Pa.

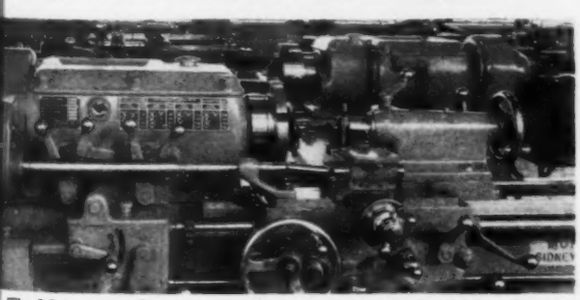
Earnest attitude of this highly-rated operator of York County is indicative of spirit prevailing throughout the area. Coarse Acme thread being chased on a Monarch lathe without a steady rest. Work is rough cut with a square nosed tool and finished with forming tool.



In this plant, flywheel rings for Diesel engines are produced from 1035 cast steel tubes 18″ in diameter and 20″ long. With one chucking, they are bored, turned and cut off on a Monarch lathe. No chatter even at 20″ from the chuck.



Breech end of trench mortar tube being finished at another plant in the York area. In background, another Monarch set up for chucking operation on a housing for hydraulic press.



The Monarch relieving attachment set up for backing-off a tap.

York County has shown the way. Through the fine co-operation of plants in this area, guns, mounts, trench mortars, and other Victory essentials are pouring out of this arsenal, on time. Teamwork has done it.

We at Monarch are proud of York's record, too. Proud because Monarch lathes are used so extensively throughout the plants in the area. In 26 shops, you'll find Monarchs on the job, day and night, saving time, turning out superior work with the finest precision. York users like Monarchs because of their complete dependability under today's severe service. Operators like them because they're easy to use, deliver a bigger day's work with less fatigue.

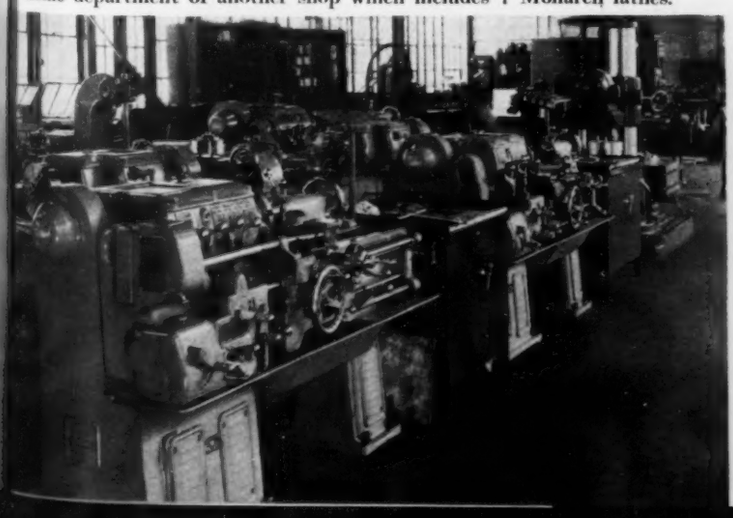
As in York County, Monarch lathes are at work throughout the country, helping build the implements of Victory. Although we are delivering twice as many Monarchs in 1942 as in 1941, they're as trustworthy, as efficient, as accurate as always.

THE MONARCH MACHINE TOOL COMPANY · SIDNEY, OHIO

MONARCH LATHES

COVER THE TURNING FIELD

Lathe department of another shop which includes 7 Monarch lathes.



Student in York Vocational School turning large diameter shaft, on Monarch lathe. Note tailstock overhangs bed, yet heavy cut is being taken. Because students move from training on Monarchs to production on Monarchs, they do faster, better work and help York set its splendid record of accomplishment.

This Industrial Week . . .

- **Baruch Back of New Steel Quota Plan**
- **WPB Branch Post Goes to Batcheller**
- **Steel "Czar" May Run Quota System**
- **Ingot Output Unchanged at 98 Per Cent**
- **War Goods Gives Detroit Less Scrap**

STEEL distribution in wartime — perhaps the toughest problem of the U. S. production front— this week was feeling the magic touch of Barney Baruch, the head of the War Industries Board in the last war and the master troubleshooter of this war.

Under Mr. Baruch's influence—he has just surveyed and made plans for whipping the rubber shortage—a new quota system under which a master scheduling board will strive to channel steel products to hungry war plants is likely to go into effect shortly.

For the past week many signs have pointed to drastic changes in the methods of war material distribution, particularly steel. The appointment of Hiland G. Batcheller, Allegheny Ludlum Steel Corp. president, as head of the War Production Board Iron and Steel Branch, one of the hottest spots in Washington, was one move pointing to a new drive for more efficient steel distribution.

Coming after the appointment of Ernest Kanzler, Universal Credit Co. (Ford) president, as WPB director general for operations, and Charles E. Wilson, General Electric president, as WPB vice-chairman, the appointment of Ferdinand Eberstadt, former chairman of the Army and Navy Munitions Board, as vice-chairman, suggests that President Roosevelt, Donald M. Nelson and Mr. Baruch—are planning fundamental changes in the War Production Board.

INDUSTRY notes that Mr. Eberstadt will be responsible for the determination of programs and schedules and will be in charge of the flow of materials. He is known to favor both the steel quota plan—which now seems headed for adoption after some rough handling by its foes at Washington—and the Contract Production Control Plan on an industry-wide basis.

The above plans involve the use of warrants, linking actual needs to actual capacity, and will replace the priorities system.

For an explanation of the quota system for steel distribution, see page 109 of the Aug. 27, 1942, issue of THE IRON AGE.

At midweek it seemed that the battle for a common sense control over steel production and distribution, whereby requirements will have to be proved before production and shipment of the steel, seemed to have been won. At a meeting at Washington, several steel men and WPB officials will meet soon to go over the plan recently submitted by Reese Taylor (former chief of the WPB Iron and Steel Branch) in an attempt to have it set in motion at once.

Thus the resignation of the energetic Mr. Taylor, sponsor of the plan, apparently has forced through the acceptance of what almost everyone in the steel trade and in important government agencies considers the answer to the steel distribution problem.

When Mr. Taylor resigned because some WPB officials could not see the necessity of a complete and unified control over steel, he had already enlisted a stout champion (Baruch) to go to bat for his ideas. Thanks to Baruch, the final steps (barring accidents) are being made to install a steel distribution system which has been in preparation eight months and contains ideas contributed by the steel industry, the War Production Board, the Army, Navy, Maritime Commission and Lend-Lease officials.

History does repeat itself where Baruch and steel distribution in wartime is concerned. Twenty-five years ago this week, Mr. Baruch called a meeting of 65 steel company executives and WPB members, at the request of President Wilson, to "take immediate steps to alleviate the chaotic steel situation." As a result of this meeting, which is said to have been near the fistfight stage, an agreement between the War Industries Board and the steel manufacturers is considered to have saved the government more than a billion (1917) dollars in war costs.

UNDER the Quota Plan for steel distribution, the Army, Navy and other government agencies will be obligated to indicate at regular intervals just how much steel they need, what they need it for, and how urgent the need is. The material is to reach the prime or sub-contractor of a war order exactly when he needs it. Adoption of the overall control plan would undoubtedly throw out the PRP and other stopgaps in attempts to get a straight line approach to the steel problem.

Unless the Taylor Plan, which now has the support of Baruch, has been much changed in the last 30 days, the Iron and Steel Branch will be headed by a steel director (in the last war the director of steel supply was Leonard J. Replogle) who will report to Donald Nelson. A board of strategy on steel requirements will periodically set up a budgeted steel distribution.

Supporters of this new plan for steel control believe that within a month or so after its adoption paperwork will be sharply reduced for steel producers and consumers, reports will be cut, and production schedules will be simplified.

The need for improvement in steel distribution is easily demonstrated. An analysis of one day's booking for one steel company showed that no order listed carried a rating lower than AA-3. This mill would hesitate to specify a delivery date even on an AA-4 rating on some products.

Another of the larger mills reports that the lowest rated order on which it could quote a delivery date was

an A-1-b on specific railroad products, but that on general steel products such as wire, rods, bars and sheets, an AA-4 would be the lowest rating considered.

Frequent changes in the strategy of the war and the constant growth in the nation's industrial war machine presents many problems, not all of which will disappear if and when the new Quota Plan for steel channeling is adopted. A short time ago the plate situation was described as the most critical, with the effects of the shortages on ship construction getting the front of the stage in war shortage discussions. This week some consumers find it easier to obtain plates than sheets. Reports from several areas indicate that the bar and sheet picture is the blacker. Alloys, of course, remain the No. 1 critical problem. Added to the tightness of the bar situation is the fact that mills are being asked to increase fourth quarter Lend-Lease tonnages by 150,000 tons of shell rounds.

TIN plate demands continue to shrink due to WPB stop orders. One midwestern company has recently started production on a new electrolytic line and is making shipments to customers. Warehouses are finding it increasingly difficult to obtain steel. Some, which have a large turnover of stock, have been regrouping their orders to the mills so that one order will carry all of its most highly rated products, insuring quicker delivery.

Sponge iron has again stepped into the picture, with a plant being proposed in New York, near the Adirondack iron ore deposits. The plant, which has not been approved in all details, will make use of the low phosphorus ores of that region. Admittedly a high cost operation, the new sponge iron plant is designed to provide badly needed electric furnace charging material. Actual work has not yet started.

The steel quota plan was not the only development on the steel front. Shortly after the announcement that its specialists will issue all preference ratings, the WPB issued instructions covering the assignment of preference ratings to military and other government orders.

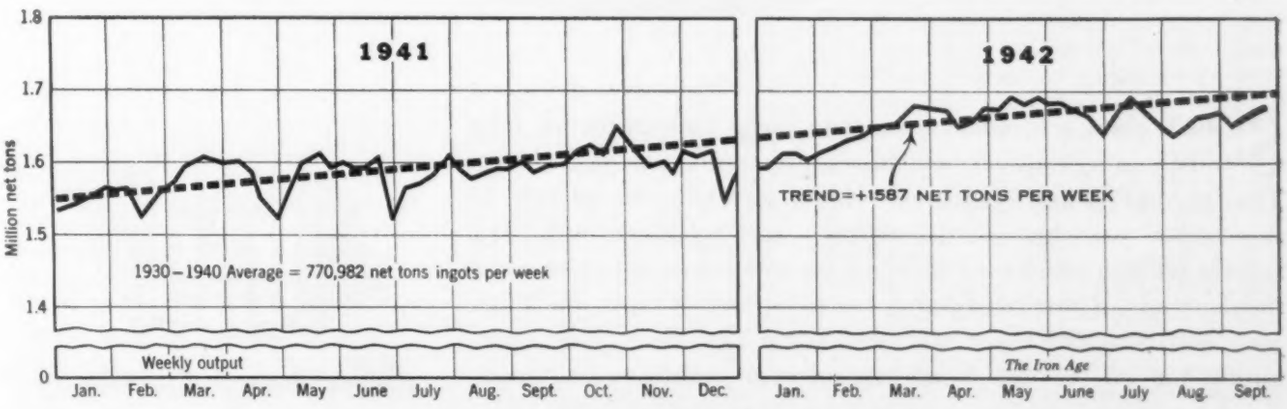
Methods assigned for WPB ratings are described on page 113

Several days ago the WPB telegraphed steel companies that any order carrying the form PD-637 was to be filled without question and without regard for any other rating, allocation, directive, or other instruction. It is expected that PD-637 will accompany only those steel orders which are so urgently needed that non-delivery of the material at once will seriously hamper the war effort.

••• HILAND G. BATCHELLER, president of the Allegheny-Ludlum Steel Corp., Pittsburgh, on Monday took up his duties as chief of the WPB Iron and Steel Branch. His appointment was announced last Friday by WPB Chairman Donald M. Nelson. David F. Austin, vice-president in charge of sales for the Carnegie-Illinois Steel has been acting as chief since the resignation of Reese H. Taylor on Aug. 31.

THE nation's steel production, this week remains unchanged at 98 per cent of capacity, with gains of 4.5 points from last week's revised rate to 109 per cent at Detroit, one point to 99 per cent at Pittsburgh, and three points to 109 per cent in the Eastern district. Cleveland advanced a point to 96 per cent while Birmingham rose a half point to 98 per cent.

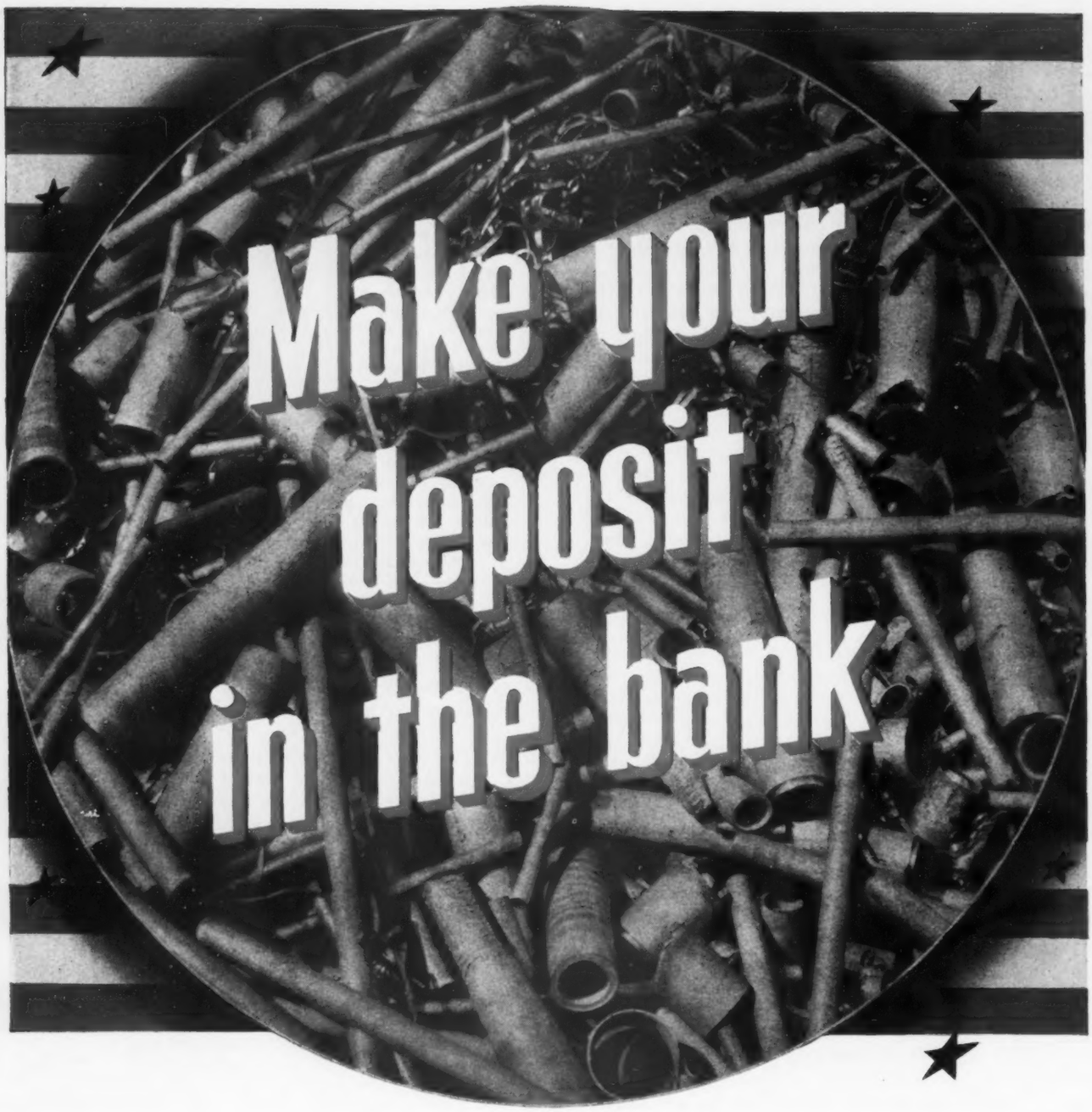
To maintain these strong steel production schedules, more scrap is needed. At Detroit THE IRON AGE was told that production of war weapons does not give automotive plants the scrap tonnages of pre-war days when automobiles were being manufactured. Scrap production in the automotive industry is estimated at 25 per cent below a normal automobile year.



Steel Ingot Production by Districts Per Cent of Capacity

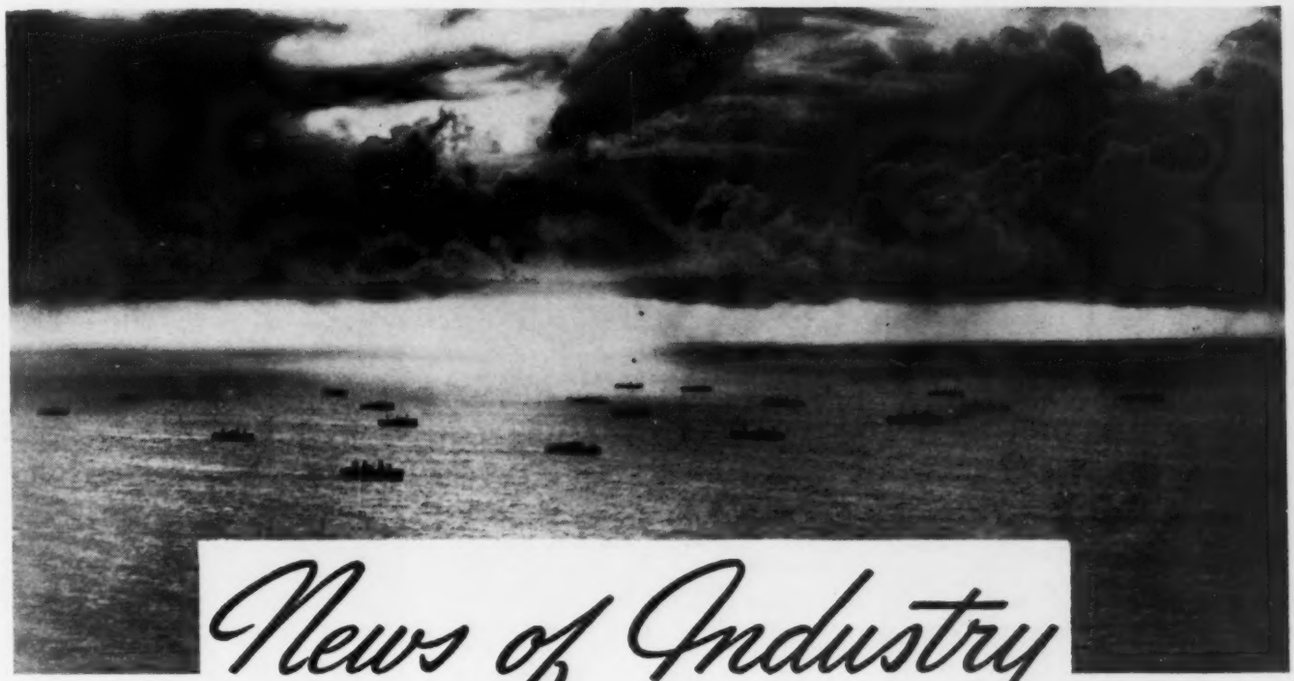
Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	S.Ohio River	West	St. Louis	East	Aggregate
September 17	98.0	102.5	94.0*	93.5	95.0*	104.5	87.0	97.5	104.5*	103.0*	102.0	94.0	106.0	98.0*
September 24	99.0	102.5	95.0	93.0	96.0	104.5	87.0	98.0	109.0	101.0	102.0	94.0	109.0	98.0

* Revised



SCRAP piles are much more than mere collections of trim ends, cuttings, useless machines, parts and junk these days. They're vital national resoures—*American Treasuries*, in fact, in this critical year; because the nation's steel producers will need several million more tons of scrap in 1942 than ever before, if the demands of war production are to be met. • How much can *you* contribute? Not just the usual scrap flow from your operations, but *all* the idle metal around your buildings and yards that it isn't absolutely essential to keep. Your deposit in the scrap bank will pay dividends all over the world—*make it a real one!*

Allegheny Ludlum
STEEL CORPORATION
GENERAL OFFICES: PITTSBURGH, PENNSYLVANIA



News of Industry

War News and Draft Speeds "Women in Industry" Hiring

Pittsburgh

• • • Far-seeing and pioneering executives started some time ago to induct women into their trades and work in advance of the day when men would be leaving for the armed forces in ever-increasing numbers, but many plants and companies have apparently waited until the handwriting was on the wall before real thought and action was taken on this vital move.

The daily changes—many for the worse—in the war picture and the upping of men and material requirements for the U. S. armed forces has at last made it clear that women must play a far more important role in coming months than was dreamed of a few months ago by most people.

Three factors are operating at present to expedite and substantially enlarge the training and employment of women in industries usually manned by male workers. Lack of labor forced many plants months ago to advertise for women and train them as far as possible to fill such positions. Actual drafting of war and other industrial workers had made it necessary to take women workers wherever they could be injected into the picture. But last and most important is the step up in hiring of women workers because of "what is ahead of us."

To hire a male worker today who is single and in 1-A would mean the loss of an employee in record time. Furthermore the repeated warnings from Washington that the army may grow to beyond 12 million men tends to keep executives from taking men who would be among the first to go when married men or those with dependents are called. It is almost taken for granted now that deferments for war work will be few and far between and those that are granted will be only a temporary stop gap until a replacement has been obtained. This situation forced to the front more than ever the need for wholesale training and employment of women on a scale never before tried in this country.

Already many companies have seen the signs and have gone all out to make sure that when the real pinch comes soon they will be ready. Much has already been done by some plants in starting a program "of women in industry" but the United States employment service through its Pennsylvania state director, H. Raymond Mason, says "Pennsylvania industry executives are still unconvinced that women can do the job as well as men. A survey by this service shows that 80 per cent of the war jobs can be handled by women and out of 624 surveyed only 57 were unsuitable for women."

Actually many jobs which have not used women have been found to be even better worked with female labor or semi-skilled women workers. A summary of a few companies which have made a start along these lines follows. It is known that there are perhaps hundreds more. But it is true from actual surveys made that many plants are moving too slowly toward the inducting of women in industry and this lack of decisive

LINE TO THE SOUTHWEST: This American convoy is shown at top of page on its way across the South Pacific to a United Nations base.

Photo by International

GIRL INSPECTORS dressed in lint-free clothes, use a microscope to examine each shaft on which rotors turn in gyroscopic aircraft instruments manufactured in a Ternstedt plant of the Fisher Body Division of General Motors Corp. In operation of the instrument, each rotor whirls at 12,000 rpm., making it imperative that the shaft be perfectly accurate, smooth and hard. At the inspection bench are trays of brass rotor wheels.

action may cause reverberation later.

ALUMINUM CO. OF AMERICA —Although this company has employed women for several years in various jobs, the signs of the times have resulted in a substantial step up in hiring women to do work formerly done by men. This includes machine operators, inspectors, and the replacement of male white collar workers within the plant. Cases are growing where skilled women workers have been furnished assistance to handle heavy lifting operations. The trend toward women taking work in this organization formerly done by men is expanding in all districts.

CARNEGIE-ILLINOIS STEEL CORP. — This company's Gary works has already started a training class for women crane operators. While they will not be trained to handle hot metal or soaking pit cranes, the trend is for women operators on other types such as finishing mill and machine shop cranes. Practically all U. S. Steel Corp. plants as well as other companies, have been rapidly replacing clerical workers in plant mill offices with girls because of the draft situation. In normal times few, if any, girls have worked inside the mill at clerical work.

OTHER STEEL COMPANIES —Many steel plants in recent months have been hiring women metallurigcal and laboratory assistants and experiences to date are said to be more than satisfactory. Jobs cover such vocations as librarians, general technicians, metallographic workers and chemists. Plans are already under way in many steel companies to use women chemists for determining the regular steel mill analyses. Before substantially increased groups of women go to work in steel mills it is necessary for the management to make considerable change in health and sanitary provisions. Locker rooms are now being enlarged and installed.

U. S. ARMY ORDNANCE—The Pittsburgh district army ordnance is rapidly changing over to women inspectors. Two months ago a large force of ordnance inspectors at one important munitions plant in the Pittsburgh district consisted entirely of men. Within the next month or two approximately 180 girls will move into this plant as ordnance inspectors, making the force approximately 60 per cent women and by next April inspection force will be approximately 90 per cent female. The same trend is noticeable in the inspection groups of the Navy's inspector of materials office. Coincident with the hiring of female inspectors by the Army and Navy is the same trend on the part of steel mills and other munition makers for taking on women inspectors.

SHELL LOADING PLANTS— At least one or more shell loading plants in the west recently completed had expected to use men workers but because of the draft and scarcity of labor had to increase substantially their requirements for female employees. Actual results so far indicate that women workers in some shell loading operations are more productive than men and the trend in these plants will be predominantly toward female labor.

OIL WELL SUPPLY CO.—This company at Oil City, Pa., which recently announced the training and addition of women employees for certain operations, plans to upgrade these girls as rapidly as possible to more intricate jobs and is reported already to have made more progress along this line than was expected. As rapidly as some women workers are found to be able to do more technical jobs, these cases are immediately upgraded and new workers hired.

CHAMPION WELDER: Mrs. Dorothy Gimblett, 34 - year - old leaderman who, after only two months on the job, is the champion welder among hundreds employed by Marin Shipbuilding Corp., San Francisco.

Buffalo Industry Fights Blacklisting

Buffalo

• • • **The Buffalo Chamber** of Commerce has petitioned L. J. Maloney, chief of the Army Service of Supply's Manpower Section, to be "fair-minded" and to "weigh all facts" before making permanent his recent drastic order to government procurement agencies to refuse further Army orders to Buffalo manufacturers if the articles can be made in another section of the country where no labor shortage exists.

The chamber said the order was tantamount to a blacklisting of Buffalo and Niagara Frontier manufacturers as far as future war orders for plants in this section are concerned.

The alleged labor shortage, declared the chamber, has been "grossly exaggerated' and an investigation will prove this so. Karr Parker, president of the chamber, wrote Mr. Maloney stating:

"We have never denied the serious shortage of certain types of skilled labor, but we do contend that this situation is national in scope and Buffalo is in the same position as other industrial centers." He added the city will suffer severe economic and employment disturbances as result of the order.

Meanwhile, Col. Burton H. Witherspoon, Buffalo, said a suspicion was growing in the minds of local leaders that "there was something behind this order.

"Some industrialists and other city leaders think there is a deliberate move afoot to throw business to New York City manufacturers at the expense of Buffalo manufacturers."

Obsolete Railroad Car Is Class Room at Steel Plant

• • • **Conversion of** an obsolete railroad passenger car into a conference car with training facilities has been accomplished at the Homestead Works of Carnegie-Illinois Steel Corp. The car has been fully equipped with blackboards and a small elevated stage for demonstration purposes. In addition, portable motion picture equipment operates on rollers in the aisles. The car is moved to different locations within the plant.

GIVE YOUR PROBLEM TO THOMAS COLD ROLLED STRIP STEEL . . .

SPECIALISTS

BRIGHT FINISH NOT COATED, HOT TIN COATED, ELECTRO-COATED WITH NICKEL, ZINC, COPPER, BRASS

THE PROPER SOURCE OF INFORMATION BASED UPON EXPERIENCE

The development of new war products involves the selection of materials which will conserve vital metals and also meet specific production requirements. Many manufacturers have placed their problem of new materials in the hands of Thomas Steel specialists. The engineering department in connection with Thomas' experienced operating men put forth a combined effort to present test samples which later may be dependably duplicated on a production basis. As a result of these procedures, Thomas cold rolled strip steel in uncoated and electro-coated finishes has replaced solid brass, copper, zinc, nickel, etc., for many war products. If you have a problem in obtaining a quality of steel to meet your war product requirements, you'll find it worth-while to put it squarely up to The Thomas Steel Company.

THE THOMAS STEEL CO., WARREN, OHIO

SPECIALIZED PRODUCERS OF COLD ROLLED STRIP STEEL

Navy Readjusts Its Shipbuilding Program

Washington

• • • **Based on a review** of the strategic situation confronting this country, the Navy Department has decided that certain readjustments in its current shipbuilding program are necessary in the interest of utilizing available facilities and materials to the best advantage. This readjustment will result in a reduction in the total number of vessels of one auxiliary type but will not affect vessels of that type required in the near future. Vessels eliminated from the program, if built, would have been completed in 1943 and 1944. The reduction in requirements will permit diversion of man-hours and critical materials to other ships in the program more urgently needed from a military point of view, the Navy Department said.

The reduction in the total number of these ships to be built will make it possible to curtail projected expansions in shipbuilding facilities and thereby further reduce the demands for critical materials. The number of men which will be affected will be very slight, it was pointed out, and will undoubtedly be reabsorbed in the same or other yards as a shortage of skilled labor still exists. The Department proposes to cancel completely the projected expansion of the Marietta Shipbuilding Corp., Point Pleasant, W. Va., which has been partially completed to date. Some reduction in the numbers of ships to be constructed by other yards will also be effected.

This action on the part of the Department is a continuation of the policy which had been promulgated by the WPB and concurred in by the Navy.

Steel Directors Meet in Chicago for First Time

• • • **For the first** time in the history of the United States Steel Corp., the board of directors of the corporation have held a meeting in Chicago.

Following the meeting on Sept. 23, the directors visited various new facilities now being constructed in the Chicago district.

BOFORS GUN ASSEMBLY: This is a general view of the production line at a Firestone Tire & Rubber Co. plant where completed 40 mm. anti-aircraft guns are moving five abreast into final inspection.

Photo by Harris & Ewing

Time-Outs GO ON QUARTER RATIONS

Compressor "down time" reduced 75% *with* SOLNUS OILS

War schedules for die castings don't allow for time-outs . . . and a shutdown of air compressors in a large plant certainly crippled production. But a Sun Engineer — one of the Doctors of Industry — had the answer with Solnus Oils.

Formerly compressors supplying high pressure air for operating die casting machines were shut down every three months due to carbon and gum formation. Now these same compressors, lubricated with Solnus Oils, have been in operation four times as long and are still going strong. Carbon and gum trouble have been stopped.

Results! To date time-outs have been placed on quarter rations and may be reduced even more. Production of vitally needed die castings for aircraft precision instruments and other war necessities is uninterrupted.

Remember whenever or whatever your problem involving petroleum products Sun's Doctors of Industry stand ready . . . willing . . . and able to help you improve your production. Let them show you the value of applying the right petroleum product in the right place. Write . . .

SUN OIL COMPANY — Philadelphia

Sponsors of Sunoco News Voice of the Air — Lowell Thomas

SUNOCO

SUN PETROLEUM PRODUCTS.. HELPING INDUSTRY HELP AMERICA

Use of Power Tools • Speedier Driving • No Slipping = 50% Less Assembly Time with Phillips Screws

Here's a way you can prove to yourself that Phillips Recessed Head Screws are "fast as greased lightning."

Check up on how many assemblies your crew handles in a day, using slotted screws. Then—give them a day's supply of Phillips Screws. Even without a change in *driving* method, production will go up. And since Phillips Screws end driver slippage, they can use power tools—with the result (on the average) that they can *double* their output.

You will *eliminate wasted effort* because the Phillips Screw clings to the driver; *prevent lost-time accidents* because screwdriver injuries are no more; and *get stronger fastenings* because Phillips Screws seat tight without heads splitting. In addition you save an average of 50% in *cost* as well as time.

Any of the firms listed below can supply you.

PHILLIPS RECESSED HEAD SCREWS GIVE YOU 2 for 1 (SPEED AT LOWER COST)

WOOD SCREWS • MACHINE SCREWS • SHEET METAL SCREWS • STOVE BOLTS • SPECIAL THREAD-CUTTING SCREWS • SCREWS WITH LOCK WASHERS

American Screw Co., Providence, R. I.
The Bristol Co., Waterbury, Conn.
Central Screw Co., Chicago, Ill.
Chandler Products Corp., Cleveland, Ohio
Continental Screw Co., New Bedford, Mass.
The Corbin Screw Corp., New Britain, Conn.
International Screw Co., Detroit, Mich.
The Lamson & Sessions Co., Cleveland, Ohio
The National Screw & Mfg. Co., Cleveland, Ohio
New England Screw Co., Keene, N.H.
The Charles Parker Co., Meriden, Conn.
Parker-Kalon Corp., New York, N.Y.
Pawtucket Screw Co., Pawtucket, R.I.
Pheoll Manufacturing Co., Chicago, Ill.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N.Y.
Scovill Manufacturing Co., Waterbury, Conn.
Shakeproof Inc., Chicago, Ill.
The Southington Hardware Mfg. Co., Southington, Conn.
Whitney Screw Corp., Nashua, N.H.

Wilson Top Arms Production Man, Nelson Announces

Washington

• • • **With the blessings of** President Roosevelt, Charles E. Wilson, president of the General Electric Co., was appointed as a WPB vice-chairman by Chairman Donald M. Nelson last Friday. Mr. Wilson will exercise the powers of Mr. Nelson in seeing to it that production programs are met, and will serve as chairman of the newly-organized Production Executive Committee.

President Roosevelt in approving the appointment, said that he was very happy to know that Mr. Wilson had been given a WPB vice-chairmanship and added:

"I have always considered Mr. Wilson one of the ablest production executives in the country, and he has done an outstanding job in the production of war materials."

"Mr. Wilson will be the top production authority in the war program and will have the responsibility of seeing to it that programs and schedules for all phases of our war effort are met," Mr. Nelson said. "I am very glad that we have been able to enlist his services and I know that he will make a great contribution to the war program."

The Production Executive Committee will be composed of top officials of WPB, the Army, the Army Air Corps, the Navy and the Maritime Commission and will maintain a constant check and control of the production program. This committee will meet twice weekly. Its other members will be:

Lieut. Gen. Brehon Somervell, Commanding General, Services of Supply, United States Army; Major Gen. Oliver P. Echols, Commanding General, Material Command, Headquarters, Army Air Force; Vice-Admiral Samuel M. Robinson, Director of Materiel and Procurement, United States Navy; Rear Admiral Howard L. Vickery, Vice-Chairman, United States Maritime Commission.

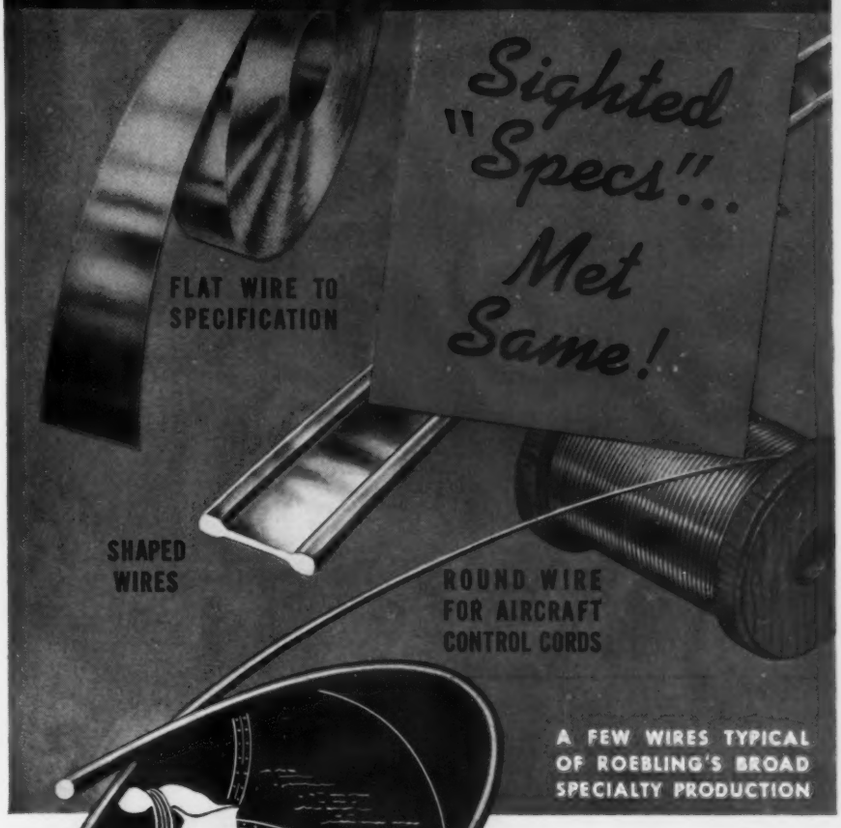
Mr. Wilson, who will serve on a dollar-a-year basis has been president of General Electric since 1940. Born in New York in 1886, he has been in the electrical in-

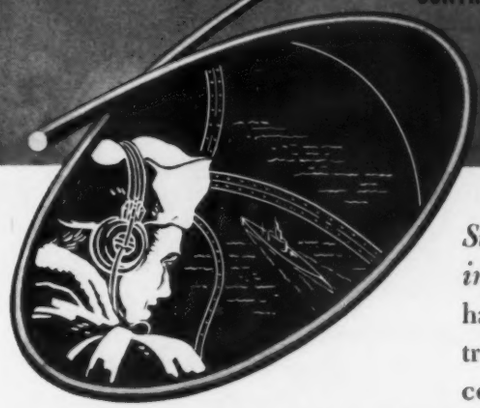
NEW WPB VICE-CHAIRMAN: C. E. Wilson (above), General Electric president, has been appointed a vice-chairman of the War Production Board. He will have "top production authority in the war program," according to Donald M. Nelson, WPB chairman, and will head a new production executive committee which includes Lieut. Col. Brehon B. Somervell, commanding general, Army Services of Suppply; Maj. Gen. Oliver P. Echols, commanding general, materiel command, headquarters, Army Air Force; Vice Admiral Samuel M. Robinson, director of materiel and procurement for the Navy, and Rear Admiral Howard L. Vickery, vice-chairman, Maritime Commission. (The committee, meeting twice a week, is to maintain a constant check and control on the war production program).

dustry since 1899, when he went to work with the Sprague Electric Co. in New York. In 1918, when the Sprague Electric Co. was absorbed by General Electric he became assistant general superintendent of the General Electric works at Maspeth, L. I., and New Kensington, Pa. In 1928 he became assistant to the vice-president, advancing to vice-president in 1930, and to executive vice-president in 1939. His home is in Scarsdale, N. Y.

ROEBLING *Wires*

ROUND . . . FLAT . . . SHAPED


Sighted "Specs"... Met Same!
FLAT WIRE TO SPECIFICATION
SHAPED WIRES
ROUND WIRE FOR AIRCRAFT CONTROL CORDS
A FEW WIRES TYPICAL OF ROEBLING'S BROAD SPECIALTY PRODUCTION



Sinking sub after sighting same calls for a steady hand plus unfailing control cords. Wire for these control cords must be made to extremely rigid specifications of steel analysis, tensile strength, ductility and dimensional accuracy. And with each step up in speed and tactical requirements, "specs" get tougher!

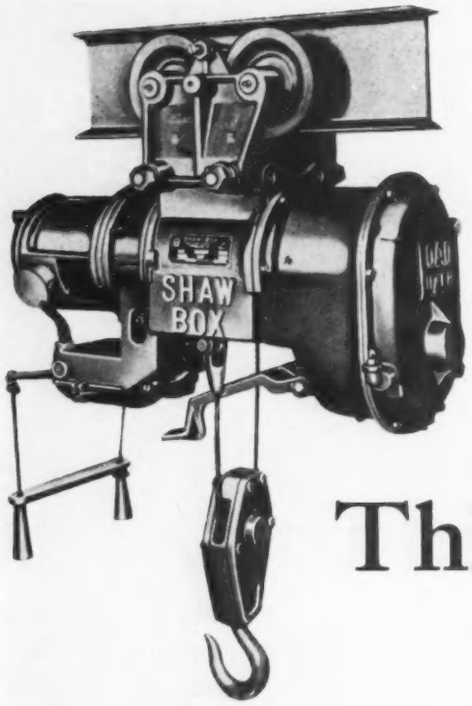
But, Roebling is an old hand at this kind of work . . . and has a backlog of experience making round, flat and shaped wires for hundreds of other war-born products.

With special steel-making facilities . . . man-power trained along custom production lines . . . we're ready and able to solve your tough specification problems, the way you want them solved.

JR ROEBLING

JOHN A. ROEBLING'S SONS COMPANY

TRENTON, NEW JERSEY · Branches and Warehouses in Principal Cities

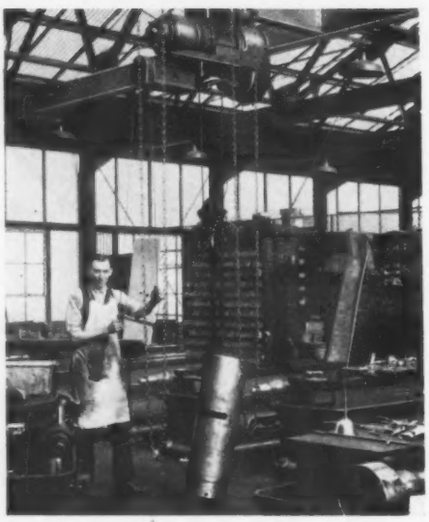


This will do it

HAVE you a tough 24-hour-a-day lifting job to do? Is it 500 lbs. or 40,000 lbs. you lift at a time? We build a 'Load Lifter' of the size and kind you want that will give trouble-free service even in these strenuous times. Reasons why? —

1. **"One-point" lubrication.**
2. **Hyatt Roller Bearings and Ball Bearing Motor.**
3. **Safety upper stop; lower blocks, sure brakes.**
4. **Two-gear reduction drive; sealed against oil leaks; steel interchangeable suspension.**

'Load Lifter' electric hoists are built with lifting capacities of 500 lbs. to 40,000 lbs. in all combinations required for industrial lifting necessities. They are adaptable to almost every working condition within their capacities. Send for Bulletin 350.



MANNING MAXWELL & MOORE INC. M&M TRADE MARK

'LOAD LIFTER' *Hoists*

MANNING, MAXWELL & MOORE, INC.
MUSKEGON, MICHIGAN

Builders of 'Shaw-Box' Cranes, 'Budgit' and 'Load-Lifter' Hoists and other lifting specialties. Makers of Ashcroft Gauges, Hancock Valves, Consolidated Safety and Relief Valves and 'American' industrial instruments.

Garand to Be Honored During Metal Congress

• • • The man who made the United States Army the best armed in the world will receive another high honor during the coming National Metal Congress and War Production Edition of the National Metal Exposition, to be held the week of Oct. 12 in Cleveland.

John C. Garand, inventor of the Garand semi-automatic rifle, will receive a special award from the American Society for Metals at its annual dinner Thursday, Oct. 15.

The rifle that is standard equipment today for both the Army and the Marines will be displayed by the Cleveland Ordnance Office in its space at the Exposition which now includes more than 270 manufacturers. The Ordnance display will be located in the War Conference Section of the Exposition in the South Exhibit Hall at Cleveland Public Auditorium.

Garand, who is 54, has always had a passion for firearms. Born in Canada, his family moved to Connecticut when he was 11. Soon he went to work in a textile mill where his natural flare for machinery soon made him a full-fledged machinist.

During the first World War when he learned the government was seeking a satisfactory machine gun, he designed one. Interested, Washington put him to work producing a working model in an office of the Bureau of Standards. But the war ended and demand for machine guns fell off.

Garand was shifted to the Springfield (Mass.) Armory and went to work on a semi-automatic rifle. His three main problems were to make it simple, strong and light. He worked night and day, and devised six separate guns. Later he combined the best features of each into one. He designed and re-designed the rear sight alone 50 times.

When he finally came up with the Garand in its present form, experts hailed it as the greatest advance in infantry arms in 25 years, and as "the best high-speed firearm on earth."

Garand is still a civilian employee on the government payroll. He has vested exclusive rights to the gun in the United States, has

refused offers from commercial manufacturers and from at least one foreign power.

A member of the Springfield Chapter of the American Society for Metals, Garand has received many honors in addition to this new one in store for him at the National Metal Congress.

Firm Holds to War Work Passes Golden Jubilee

Cincinnati

• • • **Lodge & Shipley Machine** Tool Co. will pass up any formal celebration of their Golden Jubilee which commemorates their founding in 1892. Busily engaged in "round the clock" production of machine tools for war purposes this decision was reached to assure the steady flow of production. Although no public celebration will be held, a jubilee book is being produced for distribution to their employees and the trade, illustrating and describing the company's history and achievements of half a century.

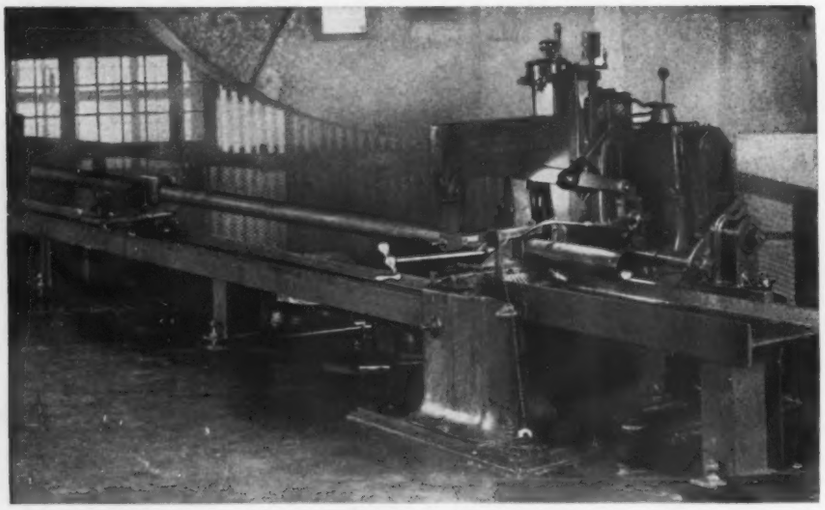
COMING EVENTS

Sept. 29 to Oct. 2—American Institute of Steel Construction, Colorado Springs.
Oct. 5 to 6—National Machine Tool Builders' Association, New York.
Oct. 7—Associated Machine Tool Dealers of America, New York.
Oct. 7 to 10—The Electrochemical Society, Inc., Detroit.
Oct. 9—Gray Iron Founder's Society, Cleveland.
Oct. 12 to 16—National Metal Congress and Exposition, Cleveland.
Oct. 12 to 16—American Welding Society, Cleveland.
Oct. 12 to 16—American Institute of Mining and Metallurgical Engineers, Cleveland.
Oct. 12 to 16—Wire Association, Cleveland.
Oct. 15 to 17—American Gear Mfrs. Association, Skytop, Pa.
Oct. 15 to 17—Federation of Sewage Works Association, New York.
Oct. 16 and 17 — War Production Conference of American Society of Tool Engineers, Springfield, Mass.
Oct. 18 to 21 — American Public Works Congress, Chicago.
Oct. 20 to 22—American Railway Bridge and Building Association, Chicago.
Oct. 27 to 29—National Safety Congress Association, international convention, Chicago.
No. 17 to 22 — National Chemical Exposition, Chicago.
Nov. 30 to Dec. 3—American Society of Mechanical Engineers, annual meeting, Hotel Astor, New York.

Murchey Taps and Dies assure you of the best in threading operations. Murchey's years of experience and engineering skill are at your service.

Murchey

MACHINE & TOOL CO., DETROIT, MICH.



cut-off metal the economical way

The most economical method of cutting-off identical pieces from bar steel is with a MARVEL Automatic Production Saw. It will give you more pieces per hour, per machine and per dollar cost than any other accurate cutting-off method. Figured in cost per piece, it will have the lowest labor cost too, because MARVEL Automatic Saws operate with no more attention than an automatic screw machine. They keep chip loss down to a minimum and on many jobs will give you extra pieces per bar. For cast automatic production or for single-cut miscellaneous work, MARVEL 6A or 9A Hack Saws are fast, accurate tools. Capacities 6" x 6" or 10" x 10", single or nested bars. Write today for Bulletin N. 600.

MARVEL SAWS

ARMSTRONG-BLUM MFG. CO.
"The Hack Saw People"
5700 Bloomingdale Ave.
Chicago, U.S.A.
Eastern Sales Office:
225 Lafayette St., New York

Round Strand
Flattened Strand
Standard & Preformed

WHY not let "HERCULES" (Red-Strand) Wire Rope help you meet present day production requirements and still maintain a reasonable margin of profit? You will quickly discover that "HERCULES" is a dependable ally—not only in today's fight against increasing operating costs—but also in your endeavor to speed up production.

Made Only By **A. LESCHEN & SONS ROPE CO.** Established 1857
5909 Kennerly Avenue, St. Louis, Mo.
New York • Chicago • Denver • San Francisco • Seattle • Portland

Hot Dip Galvanizers Lauded For War Effort Cooperation

Cleveland

• • • **Following its usual** policy of acquainting its members with analyses and discussions on WPB orders and regulations, the American Hot Dip Galvanizers' Association had as its guests here last week three WPB members who explained the various functions and aims of the Production Requirements Plan, as well as other recent orders affecting Association members. Speakers were Gordon Yule, WPB analyst, D. L. Caldwell and F. M. Carlson.

Mr. Yule, before discussing the PRP, gave the Association "a pat on the back" by declaring that the organization has met its war quotas and has fully cooperated with the government. In talking about the PRP, Mr. Yule predicted what was already coming to light last week, namely that the PRP after having been "down, then up, then down" is now "up" again. According to Mr. Yule, even if the plan is dropped, the best features of the program will be retained.

Stuart J. Swensson is secretary of the galvanizers' association.

Gear Tooth Stresses Studied By Photoelastic Method

• • • **In Bulletin series No. 335** of the Engineering Experiment Station, University of Illinois, there is published in full the paper, *"Photoelastic Study of Stresses in Gear Tooth Fillets,"* by Thomas J. Dolan and Edward L. Broghamer, both of the University of Illinois. Most of the material contained in this bulletin was prepared as a paper for presentation at a meeting of the American Gear Manufacturers Association last October.

The bulletin is profusely illustrated with charts and photographs of stressed bakelite specimens taken under polarized light to show the stress concentration areas. The authors conclude that the maximum stresses observed experimentally in this manner range from 30 to 120 per cent greater than those calculated by the Lewis equation, which has been in use for many years.

Copies of the bulletin may be obtained from the University of Illinois, Urbana, Ill., at 45c each.

Industrial Plants Given Authorization on Building

Washington

• • • **Operators of industrial** plants were given permission on Tuesday by WPB to apply for blanket authorization to cover miscellaneous construction work over a period not to exceed six months. Under the new plan all routine individual construction jobs, except those estimated to cost more than $5000 may be included in applications for blanket authorization. In cases where authorization is granted, the applicant must file within 2 weeks after the expiration of each period of the term of the authorization a report covering the work done, its cost and the material consumed. Form PD-200 should be used for all such applications and reports.

This makes it possible for both the operators and WPB to avoid handling numerous applications for construction jobs which are necessary in larger buildings, but which, under the former plan, had to receive individual authorization when the cost for all such work reached the limits set in the stop construction order.

"BEFORE OPENING THE MAIL, let us pause the usual two minutes in silent prayer for strength to face the day's new forms and requirements."

—Courtesy of The Thomas & Betts Co., Inc.

The side that can *THROW THE MOST STEEL* will win the war

Steel is the master of offense and the mills are producing it in ever-increasing amounts. But, steel takes scrap metal — plenty of it — 1000 pounds is required for every ton of steel produced.

Right now there is a serious shortage of scrap at the mills. Reserve stocks are becoming depleted. Deliveries by regular suppliers of scrap are falling short. The mills must have 6,000,000 *extra* tons of iron and steel scrap NOW to insure a continuation of production to meet war demands.

There's plenty of scrap lying around everywhere — in plants, shops, garages, farms, homes. This must be salvaged. Everyone is urged to do his part. Don't overlook any possibility — every pound counts. The metal dealer near you will pay you for it and send it to the mills. Don't delay — scrap is needed NOW — not next month or next year, but right NOW!

WE NEED YOUR SCRAP METAL
Go over your plant or shop carefully. There may be enough scrap metal lying around to build a tank, a gun, or some other war essential. Remember, steel takes scrap — 1000 pounds for every ton. Salvage all the scrap metal you can lay your hands on and do it NOW!

THE ANDREWS STEEL CO.
NEWPORT, KENTUCKY
DIVISIONS
THE NEWPORT ROLLING MILL COMPANY
THE GLOBE IRON ROOFING & CORRUGATING CO.

GUSHER COOLANT PUMP

KEEP your Machine Tools YOUNG!

Don't let the steady flow of defense work in your plant be tied up by a tardy machine tool. Insure the satisfactory and continuous functioning of your machines by using Ruthman Gusher Coolant Pumps.

They really do a good job—so much so that they are now standard equipment on many well-known machine tools. Therefore specify Ruthman Coolant Pumps —the pumps that keep your cutting tools young.

The RUTHMAN Machinery Company
CINCINNATI, OHIO, U.S.A.
1821 Reading Road

Cited for Production

• • • **Additional industrial plants** have been selected to receive the joint Army-Navy Production Award in recognition of outstanding performance on war work, Under Secretary of War Robert P. Patterson and Under Secretary of the Navy James V. Forrestal announced. The names and addresses of the latest companies honored are:

Boeing Airplane Co., Wichita Division, Wichita, Kan.

Hayes Industries, Jackson, Mich.

Mount Vernon Die Casting Corp., Mount Vernon, N. Y.

General Motors Corp., Packard Electric Division, Warren, Ohio.

Universal Building Products Corp., Dallas, Tex.

Wallace Barnes Co., Division of Associated Spring Corporation, Bristol, Conn.

Waverly Tool Co., Irvington, N. J.

T. H. Wood Co., Inc., South Coventry, Conn.

N. A. Woodworth Co., Ferndale, Mich.

American Rolling Mill Co., Zanesville Plant, Zanesville, Ohio; Butler Plant, Butler, Pa.; East Works and Central Works, Middletown, Ohio; Hamilton Plant, Hamilton, Ohio; Ashland Plant, Ashland, Ky.

E. I. du Pont de Nemours, Inc., Neoprene Plant, Rubber Chemicals Division, Deepwater, N. J.

National Carbon Co., Clarksburg Plant, Clarksburg, W. Va.

National Wire Die Co., New York.

Vanadium Corp. of America, Bridgeville, Pa.

American Brake Shoe & Foundry Co., Upset Plant, American Forge Division, Chicago.

Continental Roll & Steel Foundry, East Chicago, Ind.

Duiron Co., Inc., Dayton, Ohio.

Goodyear Engineering Corp., Hoosier Ordnance Plant, Charlestown, Ind.

Hobart Brothers Co., Troy, Ohio.

Homelite Corp., Port Chester, N. Y.

West Point Mfg. Co., Langdale, Ala.

West Point Mfg. Co., Shawmut, Ala.

THIS MAY BE MUSIC TO YOUR EARS!

● We regularly carry one hundred and eighteen different sizes of music wire in stock. They range from .005 to .256 inches in diameter and up to .080 inches this wire is available in steps of .001 inches.

Perhaps at the moment you have nothing where this material fits into your manufacturing program but, come the day when speed is paramount, it will be decidedly worth your while to get in touch with us.

Make a note, please, of these unusual facilities and when "time is the essence" . . . .

Write, wire or better still . . . phone us!

AMERICAN SPRING OF HOLLY, INC.
HOLLY, MICHIGAN

Lincoln Mills of Alabama, Huntsville, Ala.
American Smelting & Refining Co., Hayden, Ariz.
International Smelting & Refining Co., Miami, Ariz.
General Machinery Corp., Hamilton, Ohio.
Beaney Forge & Tool Works, Allentown, Pa.
Briggs Mfg. Co., Detroit.
Cessna Aircraft Co., Wichita, Kan.
Corbin Screw Corp., New Britain, Conn.
Couse Laboratories, Inc., Newark.
Cramerton Mills, Cramerton, N. C.
Electric Auto-Lite Co., Toledo, Ohio.
Federal Motor Truck Co., Detroit.
Ford Motor Co., Chester, Pa.
General Steel Castings, Granite City, Ill.
North American Aviation, Inc., Inglewood Division, Inglewood, Cal.
Bausch & Lomb Optical Co., Rochester.
Cramp Shipbuilding Co., Philadelphia.
Greenlee Brothers & Co., Rockford, Ill.
LaPointe Machine Tool Co., Hudson, Mass.

Minute Man Flag

Republic Steel Corp., Youngstown, Ohio.

Maritime Commission Award

Richmond Shipbuilding Corp., Yard No. 2, Richmond, Cal.
Oregon Shipbuilding Corp., Portland, Ore.
Bethlehem-Fairfield Shipyard, Inc., Baltimore.
Enterprise Wheel & Car Corp., Bristol, Tenn.
Western-Walker Co., Los Angeles.
Isaacson Iron Works, Seattle.
Wilson-Synder Mfg. Division, Braddock, Pa.
Selby Battersby & Co., Philadelphia.
Wickwire Spencer Steel Co., Palmer, Mass.
Marion Steam Shovel Co., Marion, Ohio.
Erie Forge Co., Erie, Pa.

WPB Salvage Section

Rubin Iron & Metal Co., St. Louis.
St. Louis Auto Parts, St. Louis.
Star Iron & Metal Co., St. Louis.

Your Experiences with NE Steels!

Are you using NE steels? If so, what grades are you using? How do they heat treat? What are their machining qualities? What other fabricating results can you report?

Your answers to these questions are vitally important to the war effort. The use of "lean" NE grades, already adopted in many war plants, must be further increased to conserve critical alloying elements.

Results of your fabricating experience with NE steels are requested by the War Production Board for transmission to all war industries. Additional information thus gained will widen the use of these steels and directly benefit the conservation program.

The need is urgent. If you have data to report, please relay it to your steel supplier today.

Peter A. FRASSE and Co., Inc.
NEW YORK, PHILADELPHIA, BUFFALO, JERSEY CITY
HARTFORD, ROCHESTER, SYRACUSE

DISTRIBUTOR OF

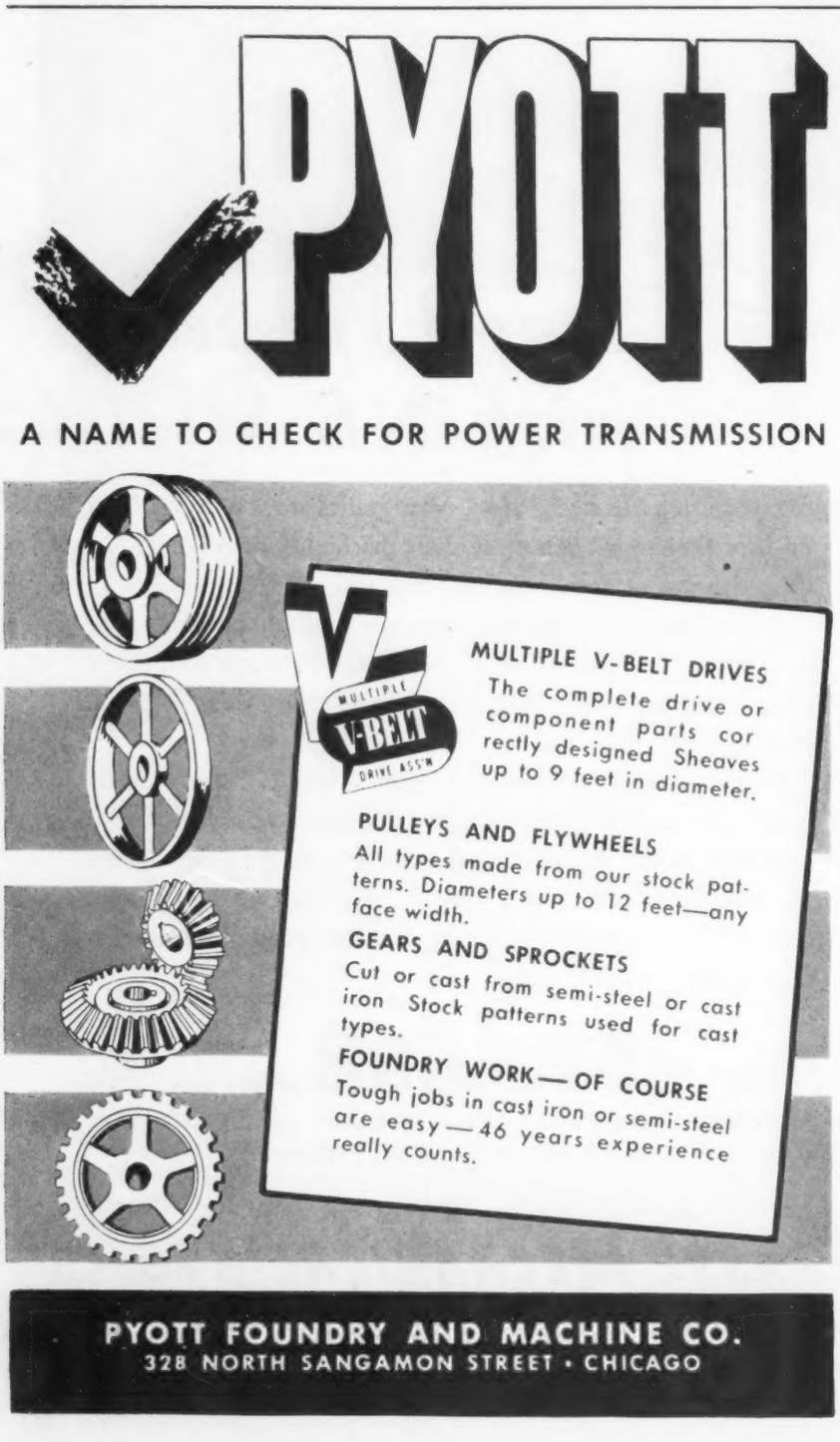
FRASSE MECHANICAL STEELS

SEAMLESS STEEL TUBING • COLD FINISHED BARS
STAINLESS STEELS • WELDED STEEL TUBING • DRILL ROD
COLD ROLLED STRIP AND SHEETS • ALLOY STEELS

Auto Parts Production On New Basis in Canada

• • • **Production** in Canada, during any three month period, of clutches, axles and other essential replacement parts for passenger cars and light trucks is now limited to 70 per cent of the quantity manufactured in the corresponding three months of 1941, under a new order issued by J. H. Berry, motor vehicles controller. The new order permits the manufacture of essential replacement parts for heavy trucks, busses and truck trailers, under a quota set at 125 per cent of the quantity produced in the corresponding three months of 1941.

The order also restricts distributers' inventories in Eastern Canada to a 60-day supply, while in Western Canada they are restricted to a 90-day supply.


PYOTT
A NAME TO CHECK FOR POWER TRANSMISSION
MULTIPLE V-BELT DRIVE ASS'N
MULTIPLE V-BELT DRIVES
The complete drive or component parts correctly designed Sheaves up to 9 feet in diameter.
PULLEYS AND FLYWHEELS
All types made from our stock patterns. Diameters up to 12 feet—any face width.
GEARS AND SPROCKETS
Cut or cast from semi-steel or cast iron Stock patterns used for cast types.
FOUNDRY WORK—OF COURSE
Tough jobs in cast iron or semi-steel are easy—46 years experience really counts.
PYOTT FOUNDRY AND MACHINE CO.
328 NORTH SANGAMON STREET • CHICAGO

Automotive Industry Output 32 Per Cent Ahead of 1941

Detroit

• • • **Automotive industry** production and employment are at all-time record highs, it was reported by the Automotive Council for War Production, with the industry producing weapons at an annual rate of $5,400,000,000. This is 32 per cent ahead of the average rate of production of non-military items in 1941, which marked the industry's peak year for peace time.

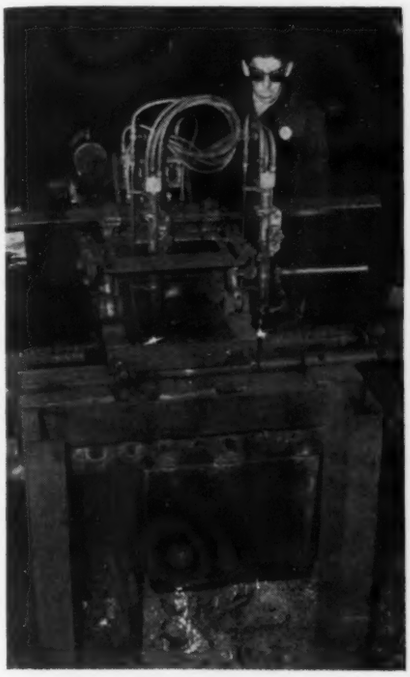
Pay rolls were said to be increasing by 40,000 workers per month. As of August, it was estimated there were 809,000 men and women turning out munitions in automotive plants, a figure 6 per cent above previous peaks and 20 per cent above a year ago. Current uptrends are expected to continue, barring shortages of materials or man-power.

Twenty-nine companies are now in production on military vehicles ranging from trucks to tank destroyers and other armored units; eight companies are making tanks; six are making marine engines of various types and sizes, one of which is supplying more than half of diesel engines used by the Navy. Seven companies are in production on, and an eighth has nearly completed tooling on, artillery pieces. Seven companies are turning out aircraft engines, and two others are preparing for similar operations; nine are building fuselage subassemblies; and five have contracts to produce complete aircraft.

Allwork Acting Chief of Plumbing, Heating Branch

Washington

• • • **Resignation of** W. Walter Timmis as chief of the Plumbing and Heating Branch was announced last Thursday by A. I. Henderson, WPB Deputy Director General for Industry Operations. Mr. Timmis resigned to join the armed services. Ronald Allwork, New York, who recently had been appointed deputy chief of the branch, was named acting chief. Before joining the WPB staff, Mr. Allwork was a specialist in the preparation of specifications data for building products. He has been associated with many plumbing and heating companies.



BLANK CUTTER: Oxy-acetylene cutting is now being used in cutting blanks from alloy steel for forging into tractor driving links for army tanks. The bar stock is fed into the machine on rollers, positioned by guide stops and cut two at a time. This view shows a cut being made.

Greensboro to Richmond 175-Mile Line Approved

Washington

• • • **The Department of Commerce** on Monday announced that DPC, upon recommendation of the Office of the Petroleum Coordinator has agreed to finance the construction of an 8-in. pipe line from Greensboro, N. C., to a point near Richmond, Va., a distance of about 175 miles. The line, to carry 30,000 bbl. a day of gasoline and light petroleum products, will cost $3,600,000 and it is expected to be in operation in approximately 4 months. To be built of second-hand pipe this line, together with a privately financed feeder line from the Houston-Beaumont area of Tex. to Baton Rouge, La., will provide a through pipe line movement to the east coast of petroleum products originating in the Texas-Gulf Coast area.

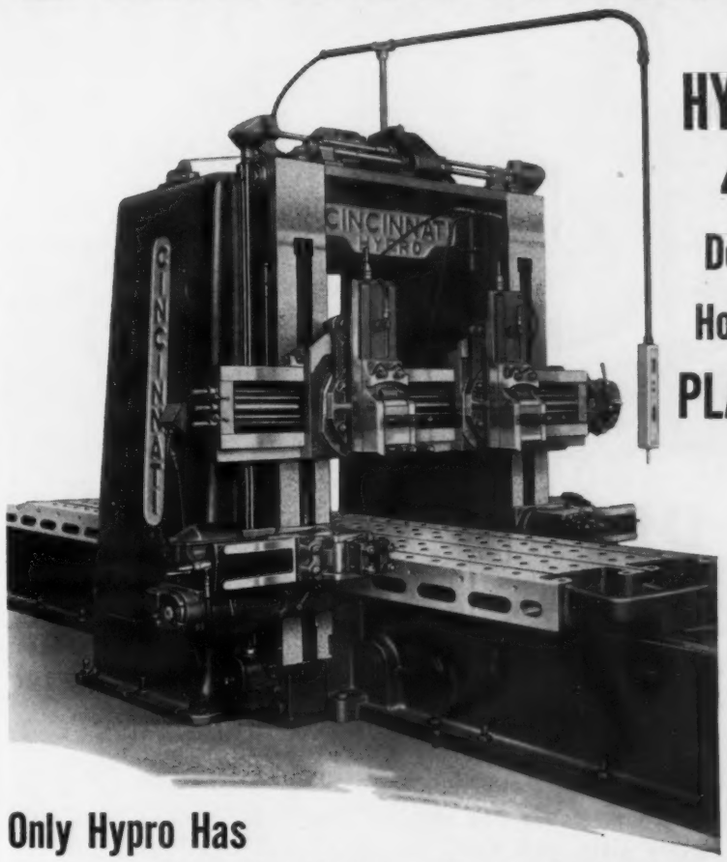
The Plantation Pipe Line Co., which is constructing the line, now has a line from Baton Rouge to Greensboro with a daily capacity of 60,000 bbl. This will be increased 30,000 bbls. daily by installation of additional pumping stations.

Scores of Specialists Trained By Carboloy

• • • **Over 200 carbide tool** specialists were trained for some 100 major U. S. industrial concerns during the first six months of 1942 at the training school operated at its Detroit plant by Carboloy Co., Inc., according to K. R. Beardslee, sales manager.

Designed for advanced training of men who will have complete responsibility in a given plant for all phases relating to the design, application, and care of carbide cutting tools, the one-week course represents the most intensive training of its kind in the country, it is stated. Currently the Carboloy Co. reports a five-week backlog in reservations for training courses for which no charge is made.

Cincinnati



HYPRO 48" Double Housing PLANER

Only Hypro Has
Pyramid Housings • Herringbone Gears

Note the extreme width of the pyramid type housings now available on all size Hypro Planers. A wide, heavy tongue, cast integral with the bed, holds housings in alignment. Write for Bulletin 135.

PLANERS · PLANER MILLERS · BORING MILLS
THE CINCINNATI PLANER CO.
CINCINNATI, OHIO

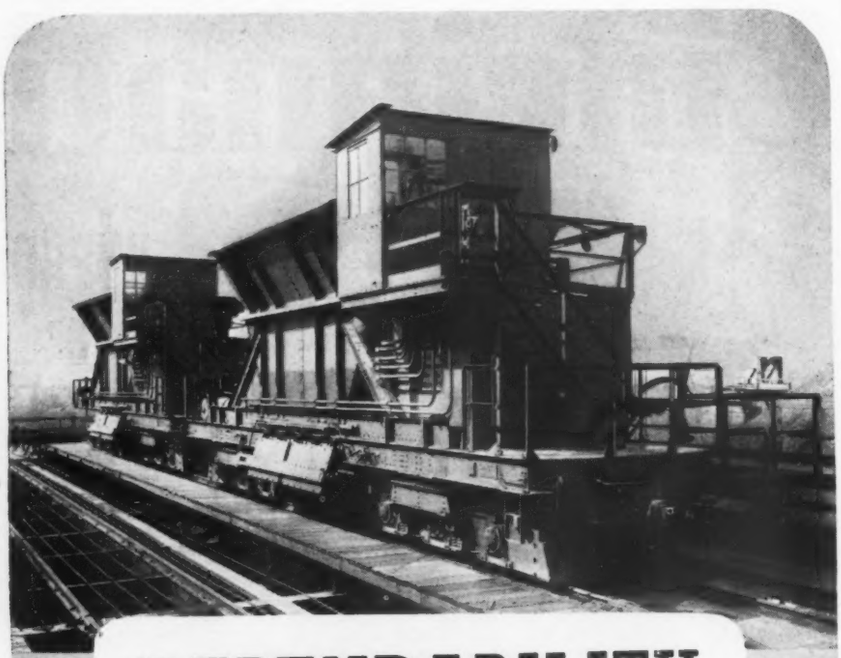
WPB to Return "On-Time" PRP Quotas by Oct. 1-15

Washington

• • • **PRP certificates** for the fourth quarter of 1942 will be returned to applicants beginning the latter part of this week, it was announced on Tuesday by Ernest Kanzler, WPB director general for operations. The certificates of those companies with major war contracts will be returned to them before Oct. 1, and all fourth quarter applications which were received on time will be returned by Oct. 15, a WPB spokesman said.

According to WPB, applications have been analyzed, the total estimated requirements have been balanced against available supplies and material and the program adjustment committee has made its recommendations for cutting back the requirements to balance the supply. These recommendations will be passed on finally by the WPB Requirements Committee on Sept. 23 and final processing of the fourth quarter PRP applications will begin immediately.

As a hedge, priorities regulation No. 11 pertaining to interim operations was modified by an amendment at the same time. As previously, companies which have not yet received their fourth quarter certificates may order up to 40 per cent of their estimated fourth quarter requirements for delivery in October. The amendment provides, however, that they may not apply preference ratings, before receiving their certificates, to more than 70 per cent of their estimated fourth quarter requirements, and they may not apply ratings under the interim procedure to a greater volume of material than they actually put into production in the first two months of the third quarter—namely, during July and August of 1942.



DEPENDABILITY
is a vital requirement in Ore Transfer Cars

Today's machinery, in order to meet the demands of our 24-hour a day schedules, must be dependable. Atlas Ore Transfer Cars are of Heavy-duty construction throughout, to assure continuous and efficient operation. Complete sizes and types to meet all operating conditions.

★ ★ ★ ★ ★

Blast Furnace Scale Charging Cars
Skips • Ore Transfer Cars
Diesel-Electric Locomotives

The ATLAS CAR & MFG. CO.
ENGINEERS MANUFACTURERS
1100 IVANHOE RD. CLEVELAND, OHIO, U. S. A.

Engineers to Hear Water Conference Papers

• • • **Speakers and subjects** of papers for third annual water conference to be held Nov. 9-10, 1942, in the William Penn Hotel, Pittsburgh, under auspices of the Engineers' Society of Western Pennsylvania.

F. N. Speller, consulting metallurgist, Pittsburgh, on *Review of Recent Developments on Under Water Paints and Coatings.*

Dr. R. B. Mears, research engineer, Aluminum Research Laboratories, New Kensington, Pa., on *The Use of Chemical Inhibitors for Aluminum Equipment.*

J. A. Holmes, director of service, National Aluminate Corp., Chicago, on *The Use of Chlorophenols in Slime Control for Condensers and Cooling Equipment.*

Prof. Frederick G. Straub, research professor, Univ. of Ill., Urbana, Ill., on *Solubility of Salts in Steam at High Pressures*

S. E. Tray, water treatment engineer, Allis-Chalmers Co., Milwaukee, on *Some Thoughts on the Treatment of Water for Power Plants Equipment Other Than Boilers.*

Dr. S. F. Whirl, chief chemist, Duquesne Light Co., Pittsburgh; T. E. Purcell, general supt. power stations, Duquesne Light Co., Pittsburgh, on *Protection Against Embrittlement by pH Phosphate Control.*

A. E. Griffin, assistant director, technical service division, Wallace and Tiernan Co., Newark, on *Bacterial Metabolism and Corrosion.* Mr. W. K. Grubaugh, bacteriologist, research laboratory, Wallace and Tiernan Co., Newark, will collaborate on this paper.

Harry A. Faber, research chemist, The Chlorine Institute, New York, on *War Time Possibilities of Water Supply Contamination.*

S. B. Applebaum, vice-pres., technical director, The Permutit Co., New York, on *The Use and Application of the Spiractor in Cold Lime and Soda Ash Water Softening.*

W. A. Darby, sales engineer, The Dorr Co., Inc., New York, on *The Use and Application of the Hydro-Treater.*

F. K. Lindsay, chief chemist, National Aluminate Corp., Chicago, on *The Use and Application of Resinous Zeolite in the Water Treatment and Other Fields.*

BOLT SUBSTITUTE: Faced with difficulty in obtaining bolts to fasten covers over outlets on oil and water coolers, an Eastern manufacturer turned to steel strapping as a solution. The simplicity of the operation is plainly evident in this view. Acme Steel Co., supplier of the steel strapping states that costs for this operation were reduced 86 per cent and . . . this crafty manufacturer is probably saying "nuts" to bolts.

Two Factors Ease Birmingham Coke

Birmingham

• • • **There is less** tenseness of demand from commercial consumers for coke produced in the Birmingham district, and this current easing is attributed to two factors:

The first is increased coking capacity and the second is the increasing limitations by the War Production Board on the use and distribution of pig iron for which coke is used for melting.

Camacho Also Heads Mexican Steel Company

Monclova, Mex.

• • • **The new steel mill** being built here with the aid of a United States loan has elected President Avila Camacho as company president and named Indalecio Prieto, former Premier of the Spanish republic, to the board of directors.

WPB Cites Increase in War Production Drive

Washington

• • • **The War Production Drive** headquarters of WPB report a substantial increase in the number of labor-management committees in war plants. Last month the number of committees increased 23.2 per cent over July's total of 1303. This figure reflects an increase of 16.8 per cent in the number of war workers so organized. The greatest increase in committees was noted in plants producing machinery, engines and tanks while the greatest increase in number of workers occured in plants making machine tools, machinery and ships.

HIGH-EFFICIENCY PERMAFLECTORS of SILVERED GLASS

Conserve Critical War Materials
Assure Prompt Delivery!

Decrease Spoilage — Reduce Accidents — Speed Production

Pick Up THE WEAK SPOTS IN YOUR PLANT!

Need MORE light, BETTER light here and there in your production line? ✪ Put in Permaflector "Auxiliaries" — the high-efficiency, silvered-glass reflectors that put the light where you need it, as you want it! ✪ A size and shape for any desired distribution. ✪ Easily, quickly, inexpensively installed without affecting work flow. ✪ Use Minimum Critical War Materials! ✪ Specify Permaflectors! ✪ A Pittsburgh lighting engineer will be glad to go over your plant without obligation!

LIGHT! — Where You Need It! . . .
For FULL illumination of Parts Bins, Tool Crib Bins and Shelves, Carton Stacks, File Rooms — wherever you need QUICK, ACCURATE SEEING from top to bottom — use Permaflectors LS-60, especially designed for this purpose. Easily, Quickly, inexpensively installed! Prompt delivery!

Pittsburgh Permaflector

PITTSBURGH REFLECTOR CO.

410 OLIVER BLDG. - PITTSBURGH, PA.

Tear Off
Clip to letterhead
Sign . Mail for
complete information, prices

Three Cargo Planes Awarded To Kaiser and Hughes

Washington

• • • **Three 60-ton** twin hull cargo planes will be built by Henry J. Kaiser and Howard Hughes. This was announced by WPB Chairman Donald M. Nelson last Friday. A DPC letter of intent forbidding Mr. Kaiser and Mr. Hughes from making a profit out of the $18,000,000 contract authorizes the builders to proceed with the design, engineering and construction of the flying boats. The planes will be made of duramold, a combination of plywood and plastic material.

Mr. Nelson said that while this work is proceeding Mr. Kaiser will draw up plans for a plant in which planes of this type could be produced on a volume basis, so that construction of the plant would be started at any time the military services decide that they want substantial numbers of this type of plane.

Engineering and construction are to be done under the direction of Mr. Hughes in his plant at Culver City, Cal. Design and engineering are to be approved by representatives of the National Advisory Commission for Aeronautics and the Civil Aeronautics Authority. Time for completion of the experimental cargo planes is estimated to be an average of eight months.

August Ore Consumption Down 20,643 Gross Tons

Cleveland

• • • **Lake Superior** iron ore consumption during August, totaling 7,155,202 gross tons, was slightly lower than July consumption, which amounted to 7,175,845 gross tons, according to the Lake Superior Iron Ore Association. Repairs on blast furnaces plus the fact that two furnaces were dismantled during the month accounted for the slightly lower consumption that was witnessed during the previous month. The cumulative consumption of iron ore up to Sept. 1, 1942, was 56,271,764 gross tons, as compared to 49,712,949 gross tons for the same period in 1941.

Total stocks as of Sept. 1 were 43,236,172 tons, as compared to 37,326,533 gross tons a month ago and 36,468,769 gross tons a year ago. These stocks, as well as consumption statistics, are for both United States and Canada.

On Sept. 1, there were 170 American and 9 Canadian blast furnaces in blast, with 10 American and no Canadian furnaces down. However, during the month, two furnaces of Carnegie-Illinois Steel Corp. were dismantled and one new furnace of American Rolling Mill Co. was blown in. Consequently, on Sept. 1 there were 189 furnaces in United States and Canada as compared to 190 a month ago and 186 a year ago.

American produced ore, from Minnesota, Michigan, and Wisconsin mines, passed the 2,000,000,000 gross ton mark some time during the latter part of the past week. Shipments up to Sept. 1 were 1,992,799,394 gross tons, which left but 7,200,606 tons to reach the 2 billion ton mark.

GREASING THE SKIDS: This familiar term, fully appreciated by most public officials around election time, aptly describes the operation being performed by this workman at Bethlehem-Sparrows Point Shipyard, Inc. In this instance the greasing is an essential operation which will insure this sleek tanker of sliding gracefully down the ways at its launching the following day.

Government Experiments On Less Tin for Fish Cans

Washington

• • • **Laboratories of the** Department of the Interior's Wildlife Service are conducting experiments to determine the adaptability for fish canning of tinplate having one-third to one-half the present tin content. Harold L. Ickes, in his capacity of Coordinator of Fisheries, said that the fishing industry has customarily used about 1600 gross tons of tin annually. If the amount normally consumed can be reduced, 800 to 1000 tons of tin can be saved.

Chief among the substitute materials under test are electrolytic tinplate, bonderized steel plate, and specially treated paper and wood. The paper and wooden products are being tested only where heat prosessing and hermetic sealing are not involved.

G.M. Consolidates Moraine and Delco Divisions

Dayton, Ohio

• • • **Consolidation of** the Moraine Products Division and the Delco Brake Division of General Motors has been announced. The consolidated division will be known as the Moraine Products Division.

Head of the new division will be Bernard A. Brown as general manager. Mr. Brown is now general manager of the Delco Brake Division. Earl S. Patch, who has been active in the development of the powdered metal products of the Moraine division, will continue with similar responsibilities in the new division.

...among the

ALLIED "FORCES"

MOST TELLING "FORCE" on the Allied side is a well known U. S. supremacy—*greater production*—via streamline-flow factory methods. The same keen-minded Conveyor engineers who have contributed to this world supremacy in "licking costs" in peace-time, now double their efforts to "lick the Jap and the Nazi". High-speed, effortless material handling is definitely among the Allied "forces." If you have a handling problem, *write* LOGAN, 545 Cabel, Louisville, Ky.

Logan Conveyors

PUT *FLOW* INTO PRODUCTION

Direct War Use Claims 75% of Steel Output

• • • **More than** 75 per cent of the nation's steel output of 5,300,000 tons a month now is going into direct war use and the remainder into such essential industries as railroads, machinery manufacture, and the like, David F. Austin, acting chief, WPB Iron and Steel Branch, reported Sept. 10. Eighty per cent of our steel is being delivered on ratings of A-1-a or higher, he added.

The 5,300,000 tons a month currently being delivered represents finished steel products, a reduction of approximately 30 per cent from ingot production of more than 7,000,000 tons. In terms of plates and shapes, sheets, bars, pipe, wire, rails, and the like, the United States this year will turn out about 62 million tons. This is slightly more than 70 per cent of the 86 million ingot tons the nation is expected to produce. The remaining 30 per cent goes back into the furnaces in the form of scrap.

This is the way the nation's ingot production has grown since 1939:

1939—52,798,714 net tons.
1940—66,982,686 net tons.
1941—82,927,557 net tons.
1942—86,000,000 net tons (estimated).

To make this increased production possible, steel-making capacity, that is, rated capacity as distinct from actual production, has been stepped up correspondingly. At the end of 1939, it was 81 million tons; 1940, 84 million; 1941, 88 million. By the end of 1942 capacity probably will reach 93 million tons and by mid-1943, 98 millions.

Current production is far ahead of the best Axis nations can do, including the German-controlled countries of Europe. Axis steel production was approximately 74 million ingot tons in 1941. The United Nations that same year controlled more than 65 per cent of the world's steel output.

Mr. Austin pointed out that the war items being made of the five million tons of finished steel a month include:

Tanks: It takes about 38 tons of steel to make a medium tank and the United States is turning out a lot of them.

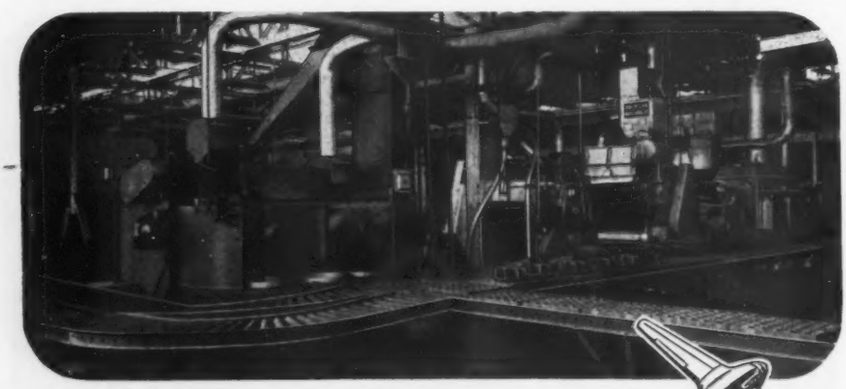
Ships: Present goals are for 8 million tons of dead-weight shipping this year and 16 million tons in 1943. Each cargo ship of the Liberty type now being made in quantity under direction of the Maritime Commission calls for approximately 4500 tons of rough steel. Current production is around 70 ships a month.

Planes: The big four-engine bombers take 15 tons of steel each. Fighter planes take 3½ tons and the other types fall in between.

Guns: Some of our anti-aircraft guns use up 14 tons of steel each; thousands of rifles, machine guns, anti-tank guns, and howitzers use steel, all the way up to the giant 16-inchers that take 576 tons of steel each.

Thousands of additional tons of steel are going into naval ships, airplane carriers, submarines, destroyers; into peeps and jeeps and armored cars and trucks; into ammunition and aerial bombs (it takes half a ton of steel to make one of the 2,000-pound bombs the British have been dumping on German cities lately); into bayonets and helmets and radio equipment and the thousand and one odds and ends that accompany a modern army into war.

The United States is building barracks for soldiers and these buildings require some steel even



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THE WHEELABRATOR SETS A FAST PACE

CHICAGO, ILL.: A 48" x 72" WHEELABRATOR Tumblast requires only 8 minutes to remove annealing scale and 4 to 5 minutes to rough clean loads weighing from 1,000 to 2,000 lbs. in this large jobbing foundry.

CLEVELAND, OHIO: The installation of a 6' Plain WHEELABRATOR Tablast enabled this large jobbing foundry to reorganize its cleaning department and speed-up shipment of castings to war production customers.

SPARTANSBURG, S. C.: Approximately 22 tons of gray iron castings are cleaned in less than five hours in a 48" x 42" WHEELABRATOR Tumblast at this large textile machinery company.

ROCHESTER, N. Y.: By installing a special two-wheel WHEELABRATOR Cabinet, this railroad parts manufacturer was able to clean reservoir castings, much faster, more thoroughly, and at a 50% saving in cost.

MILWAUKEE, WISC.: This large manufacturing company cleans 2,000 pound loads of malleable pipe fittings in ten minutes in a 48" x 42" WHEELABRATOR Tumblast.

TOLEDO, OHIO: This large jobbing foundry cleans forty to fifty tons of green and annealed steel castings in fifteen hours on a special WHEELABRATOR Tablast.

THE AIRLESS WHEELABRATOR BRINGS YOU THESE ADVANTAGES

1. High-speed cleaning
2. Low cleaning cost
3. Reduces horsepower
4. Conserves space
5. Reduces breakage
6. Speeds up machining and grinding
7. Lengthens tool life
8. Simplifies inspection
9. Improves appearance
10. Provides perfect bond for final finishing
11. Insures accurate hardness tests

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when they are built of wood. We devoted 55,000 tons of steel a month to nails in 1940. This year that is being upped to 72,000 tons.

Then there are hangars for airplanes and machine shops to repair them; submarine nets for harbors; steel for Dutch Harbor, steel for Eritrea, steel for the British, steel for the Russians, steel around the world.

Steel to build synthetic rubber plants, aviation gasoline plants, new chemical plants, new steel plants, new aluminum plants and new airplane plants, is necessary. We have to continue to make machine tools and mining machinery and we cannot cut off completely the supplies of steel to the railroads, the oil industry, the farm machinery manufacturers, the utility companies and other essential industries. They are not getting much steel these days, but they do have to have some.

Mr. Austin said the problem of steel is one of proper scheduling and planning in order to come out even on a well-balanced war production program, based upon the amount of material available. Scheduling has been a tough problem so far, he said. After Pearl Harbor we roared out to make all of everything we could. We stopped the production of civilian articles so there was plenty of steel available for every factory for a while. Now the time has come when the program must be brought into balance. It's just now that we must make our 5 million tons of production fit a demand of around 9 million tons a month.

One important reason the program is out of balance today is that the resourcefulness of American industry, when sent to war, could not be foreseen. This country had had no experience in fabricating implements of war. We did not know what our production men could do until they got to doing it. Today our factories are turning out some parts faster than anyone dreamed it could be done a few months ago. Rifling a gun barrel is one of the most delicate machining tasks of all. It now is being one in one-thirtieth of the time it took a few months ago. It used to take more than six hours to counterbore 280 holes in the crankcase of an aircraft engine. It's being done now in 65 minutes. And so it goes.

The result is that we have a capacity to "chew up" steel faster than we can make it. Unfortunately, we cannot make the "chewing up" capacity the yardstick for war production. Steel-making capacity has to be that yardstick because it cannot be increased as rapidly as can the plants which consume steel. That is why some plants operating on war contracts have had to slow down at times for lack of materials.

Also in the picture is the fact that big steel users must receive a substantial quantity of the steel they consume some time in advance of its use. We are pouring steel into a vast industrial pipeline today that will not emerge as finished products for several months. This—which is also a scheduling problem — means that the quantity of steel being ordered today is the reflection of future production rather than current production.

LOST TIME MEANS LOST LIVES

Save Both WITH KENNAMETAL*

Money is not now the only value placed on time. The war has forced time lost to be measured now in lives lost in our armed forces.

Every minute gained in our production system means saving soldiers' lives for further action against the enemy.

KENNAMETAL has met the nation's demand for increased production. KENNAMETAL bores, turns, and faces steels faster than ordinary carbides. In addition, tough jobs such as cutting hard welds, and steels up to 550 Brinell hardness, and making jump cuts, are handled quickly by KENNAMETAL.

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Write for the Vest Pocket Manual which gives complete information on this superior steel-cutting carbide.

Visit the Kennametal Booth C-110 at the National Metal Congress.

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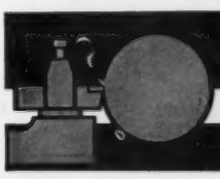
* INVENTED AND MANUFACTURED IN U. S. A.



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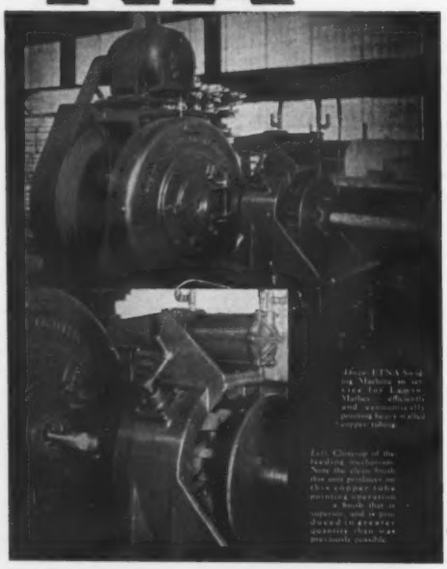
They had a job of pointing heavy-walled copper tubing, and wanted to speed up the operation. Just how to do it didn't appear on the horizon, and so Lewin-Mathes did the safe and logical thing—they put their swaging job up to Etna.

The answer to that problem is illustrated on this page. It's a modern Etna Swaging Machine that points *more* copper tubes per hour in less time at less cost. If you have a problem involving tapering or reducing tubing and solid rounds—ask Etna about it.

Etna has the swaging machines from ⅜" to 4" and the experience to help you get the most out of this type of machine.



IF IT'S A QUESTION OF TAPERING, SIZING OR REDUCING OF ROUND SOLIDS OR TUBING... "Ask ETNA About Swaging"

ETNA MACHINE COMPANY
TOLEDO OHIO

WE PUT THE KIDS
TO BED IN 1865!
Atop the roof of the Dunbar spring plant is perched a bell... summoning the workers in the morning... sending them home at night. This bell also performs a community service... for, rung 99 times at nine in the evening, it sends all children home and to bed. The bell still rings... the tradition almost forgotten. But the tradition of fine workmanship still goes on in the hands of another generation of spring-makers, whose talents are actively engaged in helping to meet the crisis of 1942.
1865
SINCE 1845
1942
Dunbar Bros. Co., Bristol, Connecticut
DIVISION OF ASSOCIATED SPRING CORPORATION

AISI Booklet Tells How to Black Out Steel Plants

• • • **Already a much discussed** subject, mostly from the standpoint of British experiences, the protection of steel plants during air raids is described generally in a new booklet produced by the American Iron and Steel Institute. The booklet describes the selection of personnel and organization of an air raid protection staff, the establishment of zones, sectors and posts, outlines the duties of the air raid staff during an emergency and gives other essential information and vital facts necessary to efficient steel plant protection under bombardment. The booklet is well illustrated with detailed organization charts.

Of particular interest to steel men are the specific instructions given for blacking-out the steelworks and coke ovens. Briefed versions of these instructions are:

Coke Plants

Coke plant operations are described as such that a work-stoppage, which means a cessation of charging and pushing, can be enforced for a period up to one hour without losing production that could not be made up. The glow of the hot coke and the steam from quenching are said to be equally visible at night.

Blast Furnaces

When advanced notice of a raid is given, it is possible to run the furnaces "on check" thereby delaying the cast by a period of up to an hour, timed with the expected occurrence of the raid. Pig machines should be shut down with all pig quenched below the glow point.

Bessemer Converter

Since converter cycles are usually no longer than 10 to 20 min., at the sound of an alarm the vessel should be emptied and turned down to eliminate the glow. Cinder pans should be sprayed to eliminate the glow and the hot steel from the vessel taken under cover and teemed immediately. Hot molds are to be covered. Glowing ladles should be moved under cover.

Open Hearth

Open hearth operations can be slowed down when a raid is an-

ticipated so that tapping will not occur during the black-out period. If a tapping is in progress, the steel should be teemed as soon as possible, the ingot molds covered and the glowing ladle turned toward the furnace wall. Hot ingots or molds in the yards are to be moved under cover. The fact that open hearth operations are conducted under roof considerably lessens the problem.

Lincoln Publishes 7th Edition Of Arc Welding Handbook

Cleveland

• • • **In the 7th edition** of "Procedure Handbook of Arc Welding Design and Practice," published by the Lincoln Electric Co., the authors have made every effort to provide as much complete and up to date information as possible to meet the needs of war industries using welding practice. The book has been greatly enlarged over previous editions and now contains 1308 pages and 1810 illustrations.

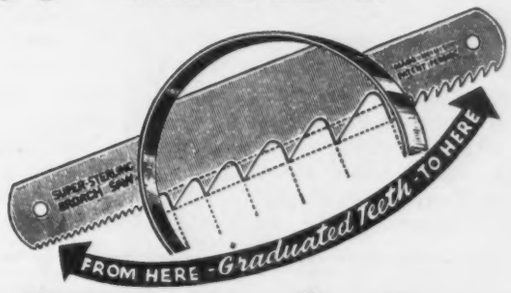
New information is given in the handbook on such subjects of welding symbols, allowable stresses, pre-heating for welding, stress relieving, speeds and costs of welding, the new Fleet-Fillet technique, general metallurgical characteristics of metals and alloys, weldability of aluminum alloys, tubular construction and appearance and styling of welded design. The publisher acknowledges the aid of nearly 300 contributors to this edition, which represents the 23rd printing of the handbook, since the first one was issued in 1933.

The handbook is divided into eight sections: Welding methods and equipment (26 pages); technique of welding (116 pages); procedures, speeds and costs (119 pages); weld metal and methods of testing (30 pages); weldability of metals (98 pages); welded steel construction and machine design (204 pages); designing of arc welded structures (274 pages); and typical applications of arc welding in manufacturing, construction and maintenance (439 pages). This last chapter, which is a book in itself, is illustrated clearly.

The handbook is bound in semi-flexible covers and is sold postpaid at $1.50 per copy in the United States and $2.00 elsewhere.

BROACH ACTION *means* *LIGHTNING* **SAWING**

For Faster Easier Metal Cutting



Here's one saw that doesn't just "hack" away—it cuts quickly and cleanly. Study the tooth design—notice the increase in pitch and height from the starting end to the back. This means easy starting, swifter cutting without chatter or sticking. You'll save time and money with these husky super-sterling blades. Ask your mill supply dealer—or write for details today.

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They Dont Scratch .. They CUT

HEAT-TREATED STEEL SHOT

We manufacture shot and grit for endurance

A shot or grit that will blast fast with a clean finish.

This is the only reason why so many operators are daily changing to our shot and grit, from Maine to California.

The unprecedented demand for our—

Heat-Treated Steel Shot and Heat-Treated Steel Grit

has enabled us to expand our production and maintain a quality that is more than satisfactory to our hundreds of customers all over the country.

•

HARRISON ABRASIVE CORPORATION
Manchester, New Hampshire

HEAT-TREATED STEEL GRIT

Changes in Loading Rule Advocated at Toledo Session

Toledo

• • • **Amendments** and exceptions sought in an Office of Defense Transportation order on railway car loading, to go into effect Oct. 15, were discussed at a meeting of the Great Lakes Regional Advisory Board last week.

This order, No. 18, was to go into effect Sept. 15 but was postponed for 30 days pending consideration of questions raised by shippers. Most of the problems discussed at the Regional Advisory Board meeting dealt with load limit requirements set forth in the original order.

One important exception sought involved the loading of scrap and bulk commodities. It was pointed out at the meeting that foundries or stamping firms seldom weigh shipments themselves but use railroad reports on weights. Feeling was that the forthcoming order should provide for a tolerance of 5 to 10 per cent below carload limit capacity. Thus cars could be loaded on an estimation basis whereas loading to full limits would raise the possibility that an overload might develop and delay movement of the car while it was returned to the shipper from the railroad weight station.

It was also recommended that the provision in the original order requiring utilization to the load limit of all rail cars be changed to utilization to marked capacity, thus allowing for variance in cars.

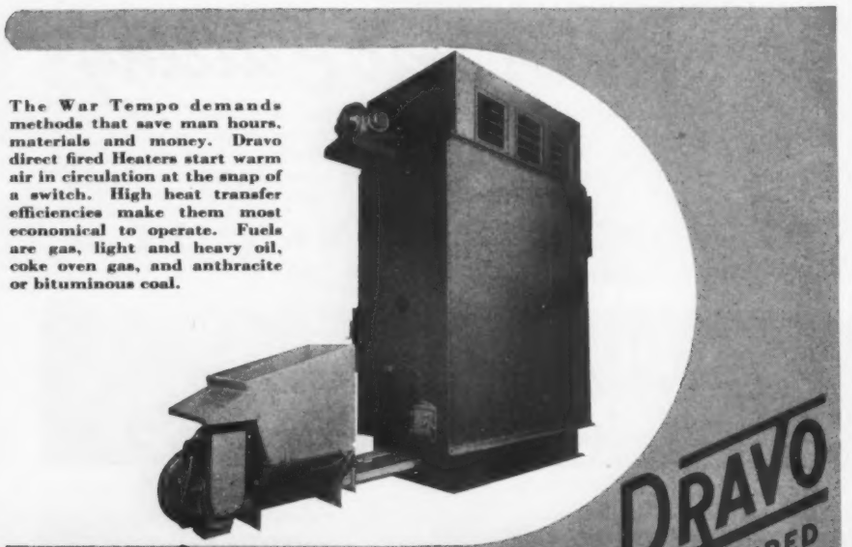
An exemption also was recommended for small manufacturers working with allocated materials. It was pointed out that such allocations make impossible in some instances the output of enough goods to fill a car. The government hope has been that multiple loads would develop, produced by several manufacturers in a locality to the extent that a full car could be loaded. But shippers expressed belief that this was impractical.

As the order is now set up, war material is exempt from the full car requirement when shipped to the Army, Navy or other government agencies. The shippers will seek an amendment so that actual movements of war material in unfinished, semi-fabricated or subassembled stages can be made in less than full car lots when moving between manufacturing concerns.

Definition will also be sought, it was decided, of the word "armament" in the order. The question was raised whether "armament" shipments, exempt from full car requirements, would cover trucks and tanks, as well as guns, etc.

New Labor Problem Manual

• • • **A new manual** of procedures, "Breaking the Skilled Labor Bottleneck," just off the press Sept. 1, explains what steps to take in training new labor, how to spare highly trained men for their own specialized work, what to do about upgrading and many other problems. The author is Eugene J. Benge, management engineer. Published by the National Foreman's Institute, Deep River, Conn., $2.50.



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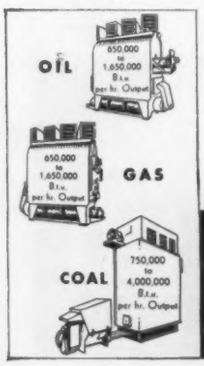
THIS coal-burning heater is a self-fired unit containing its own combustion chamber as well as the motors and fans to circulate warm air in the space to be heated. It is a "life saver" for those sections of the country where coal is the only available fuel. One or more heaters of this type can be arranged to provide working temperatures for any size or shape of industrial building. Such a system offers advantages of quick installation, lower cost than central steam plant, and flexibility in use to provide temporary heat or a permanent heating system.

Note—the heater shown above is hopper fed; bin fed models are also available; 9 sizes of self contained units, output capacities from 750,000 to 4,000,000 B.t.u. per hour.



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Labor Highlights

Full Wage-Farm Powers Close

•

Committee Disavows Labor-Control

•

Alcoa Strike Threat Ends

Evidence of Labor Migration

•

41 Steel Firms to Show Cause or Meet "Big Steel" Wage

•

CIO-Bethlehem Sign Agreement

• • • **Most closely watched** activity in the labor field today is the Congressional struggle to provide legislation which will permit the President to have his wish to control farm prices and wages of war industries. Although the texts of recent measures drawn up by both the House and the Senate have shown no discrimination between war labor and non-war labor with regard to their control by the President, it is believed that he will confine his activities to the limiting of war industry wages.

This belief is predicated upon the fact that war wages will always play the major part of wage's influence on inflation and follows a policy of doing the big job first with the smaller details to be ironed out as they occur. However, the President's powers will probably be sweeping and fully capable of controlling all industrial wages if this is deemed necessary by the Chief Executive.

Some members of the Senate and House Committees on Banking and Currency are said to have expressed a fear that organized labor would fare better than the farm group if present measures were left as they stood. The Senate Committee threw out the "little steel" 15 per cent principle from their measure while the House Committee wrote the same principle into theirs with modifications which would allow the President to raise wages above this limit to meet advanced living costs.

Philip Murray, president of the CIO, possibly hoping for terms even juicier, pronounced the inclusion of the "little steel" formula in legislation as "thoroughly unjust" and held that it would "destroy morale of American workers." From a more liberal point of view, the House interpretation of the bill seems well qualified and just, in that it not only includes a formula which has been accepted for wage stabilization, but also permits further increases, if necessary, on the same accepted basis. However, if this safety valve is left in the measure to permit higher wages for the industrial worker in the face of rising costs, it stands to reason that the farm price section of the measure will necessarily set prices at parity with a vent somewhere to permit a slow rise at the President's discretion. A measure of this kind would not seem to impose very strict inflation restraint but does in effect give an immediate starting place for control and places the balance of the power directly with the President.

• • • **At least second** in the interest of labor this week are the recent declarations of Paul V. McNutt, chairman of the War Manpower Commission with regard to a fore-shadowed labor-control act, which would give sweeping powers to the government in labor migration and other labor supply problems similar to the job-freezing plan recently adopted by Canada and the new rulings recently imposed on all federal employees. Mr. McNutt declares such a measure "inevitable" and states that he believes "the people are ready for it."

A special House Committee on Defense Migration is now studying methods for full utilization of the country's manpower. A poll of the five-man committee disclosed a general belief that the job of placing labor should be continued on a voluntary basis despite the assertion of Mr. McNutt. However, a hint that the government might soon act to keep farm workers from quitting their jobs for bigger paying factory work was dropped by Secretray of Agriculture Wickard, when he said if "a patriotic appeal for men to stay on the farm won't work then we will have to make some other approach."

• • • **Evidence that migration** is a very real problem that should hardly be overlooked by even a House Committee on Defense Migration, is the recent migration of metal miners and other types of workers in the West which has been so severe that last week 12 western states were declared a "critical labor area." Further evidence is the action this week by a WLB mediation panel which recommended pay increases for these metal miners of from 2½ to 15 per cent, thereby setting aside the "little steel" formula for the first time. The assenting group considered this action necessary, it was stated, to halt the migration to higher paid fields. Apparently the decision was based on eliminating inequalities between industries competing for the same labor which is beyond the scope of the 15 per cent formula.

The dissenting vote of the panel, however, struck a note of utmost seriousness when they warned that departing from the usual formula meant demands for similar treatment from other critical war industries using the same leverage as the miners (that of migration) and serve to further the upward spiral of wages, living costs and inflation. This certainly adds a new meaning to Mr. McNutt's declaration that labor control may be necessary soon. Labor has a new weapon and the first battle with it is won except for a

Press Association photo

CALLING OFF A WAR PLANT STRIKE: Employees at the Western Cartridge Co.'s plant at Alton, Ill., returned to their jobs recently after a four-day strike following a dispute between the company and the AFL Chemical Workers Union. Shown calling off the strike is Fred Olds, an AFL organizer. The dispute was turned over to the War Labor Board for settlement.

WLB public hearing on the case Sept. 24.

•

41 Firms to "Show Cause" Or Grant "Big Steel" Wage

• • • **In a deliberate action** to unify the whole iron and steel industry on the subject of wages and to end the "ineffectual" collective bargaining negotiations between the United Steel Workers of America CIO and some 41 steel companies, the WLB unanimously adopted a resolution Sept. 17 requiring these companies to show cause within the next ten days why the board's rulings in the Carnegie-Illinois Steel Corp. case should not apply to them.

The board's ruling refers to the 5½c. wage increase granted to 400,000 "Little Steel" employees and five subsidiaries of the United States Steel Corp. that, in both instances, granted retroactive pay to February. It is understood, in the case of the 41 steel companies named in the board's resolution, that the union has been struggling ineffectually to get the same terms for 200,000 employees of these companies without resorting to threat of strike.

The difficulty encountered by the union is said to be the unwillingness of the 41 companies to grant the retroactive feature of the ruling, and in some cases the maintenance of membership clause and check-off in the contracts. There is some reason to doubt that the retroactive feature can be enforced legally on at least some of the companies involved depending on the amount of notice of desire to negotiate which may have been given by the union in each individual case. Each of the 41 companies will be given ample opportunity in the ten days, following issuance of the WLB "show cause" order, to submit their stand. It will be recalled in the Big Steel case that the WLB was openly accused, by the minority in the decision, of violating the sanctity of the contract. Whether this issue again enters the conflict remains to be seen.

The WLB pretense that legal considerations can possibly make any differenece in the outcome of its predetermined "decisions" is still maintained as the board took this novel action at the request of the CIO-USW. The text of the board's dare to show cause follows:

"The United Steelworkers of America, under date of Sept. 3 filed with the chairman of the National War Labor Board a request that the Board direct certain companies in the basic steel industry to include in their collective bargaining contracts with United Steelworkers of America, all provisions contained in the Board's Directive Order of August 26, in the case involving Carnegie-Illinois Steel Corp., et al. A copy of that order is attached hereto. Your company is included among those listed.

"You are hereby requested to submit to the Board within 10 days your reasons, if any, why the provisions contained in the Board's decision in the case of Carnegie-Illinois Steel Corp., et al should not be incorporated in your contract with the United Steelworkers of America."

The companies which will be ordered to pay a 5½c. an hour increase retroactive to Feb. 15, and to incorporate the closed shop and check-off provisions in their "contracts" with CIO-USW are as follows:

Struthers Iron & Steel Co., Struthers, Ohio; Allegheny-Ludlum Steel Corp., Pittsburgh; American Locomotive Co., Latrobe, Pa.; Atlantic Steel Co., Atlanta; A. M. Byers Co., Pittsburgh; Continental Steel Corp., Indianapolis; Empire Sheet & Tin Plate Co., Mansfield, Ohio; Jones & Lauhglin Steel Corp., Pittsburgh; Latrobe Electric Steel Co., Latrobe, Pa.; Pittsburgh Steel Co., Pittsburgh; Sharon Steel Corp., Sharon, Pa.; Stanley Works (American Tube & Stamping Division), Bridgeport, Conn.; Universal-Cyclops Steel Corp., Bridgeville, Pa.; Acme Steel Co., Riverdale, Ill.; American Chain & Cable Co., Page Steel & Wire Division, Monessen, Pa.; Wheeling Steel Corp., Wheeling, W. Va.; Apollo Steel Co., Apollo, Pa.; Babcock & Wilcox Tube Co., Beaver Falls, Pa.; National Supply Co., Spang-Chalfont Division, Pittsburgh.

Mackintosh Hemphill Co., Pittsburgh; National Erie Corp., Erie, Pa.; National Malleable & Steel Casting Co., Sharon, Pa.; Taylor-Wharton Iron & Steel Co., Easton, Pa.; United Engineering & Foundry Co., Pittsburgh; Lewis Foundry & Machine Co., Coraopolis, Pa.; Pittsburgh Rolls Corp., Pittsburgh; National Alloy Steel Co., Blawnox, Pa.; Shenango Furnace Co., Pittsburgh; Mercer Tube & Mfg. Co., Sharon, Pa.; Moltrup Steel Products Co., Beaver Falls, Pa.; Penn Iron & Steel Co., Creighton, Pa.; Pollak Steel Co., Cincinnati; Wheatland Tube Co., Philadelphia; Wyckoff Drawn Steel Co., Pittsburgh; Andrews Steel Co., Newport, Ky.; Reliance Steel Casting Co., Pittsburgh; Heppenstall Co., Pittsburgh; Jessop Steel Co., Washington, Pa.; Judson Steel Corp., Oakland, Calif.; Vanadium-Alloys Steel Co., Latrobe, Pa.; Columbia Steel & Shafting Co., Pittsburgh.

•

WLB Refuses Migration Curb

Buffalo

• • • **The WLB rejected** the recommendation of mediator, Benjamin Aaron, that they grant a six cent wage increase to employees of the J. H. Williams Co. after learning that both the company and USW-CIO representatives admitted that the raise was not necessary to meet increased living costs. Mr. Aaron is said to have recommended the pay raise solely to insure a stable labor supply for the company. This was, presumably, a migration curb but might have back-fired by drawing workers from other strategic Buffalo industries had the increase been granted.

•

WLB Names G-M Pay Increase

Washington

• • • **The WLB ordered** an increase of 4c. an hour for 225,000 General Motors employees in a decision made public Sept. 18. The increase was granted at four cents as a means of adjusting wages to increased living costs but was contrary to the recommendation of the panel who heard the case and who recommended a five cent boost. The panel had asked for five cents, estimating 1½c. of this to offset advanced living costs and 3½c. to narrow a differential existing between G-M and Ford wage levels.

•

Canada Asked to Ban Independent Unions

Ottawa

• • • **The Canadian Congress of Labor,** here last week, adopted a resolution asking immediate enactment of legislation which would outlaw the company union and make collective bargaining compulsory. The resolution is reported to have called on the government "to set an example of genuine democracy for victory in this war by immediately guaranteeing collective bargaining and signed union contracts in government owned and operated plants."

•

Murray Urges Canadians Not to Strike

Ottawa

• • • **CIO president, Philip Murray,** in an address here before the Canadian Congress of Labor, urged Canadian workers to refrain from indulging in strikes. He said that the United States had come to realize that "there must be no divisions, no contentions, no slandering or abusing of each other" if this war is to be won.

"All of us recognize," he said, "that labor must not only play its part but that we have to play a sacrificial part if we are going to have labor unions in this country after the war."

New Pricing Procedure for Idle or Frozen Material Set

• • • **Idle or frozen** materials sold under Priorities Regulation No. 13 may be disposed of at prices computed f. o. b. present location, OPA said Sept. 16.

As originally issued, Maximum Price Regulation No. 204 covering such sales provided that a seller's maximum price for such materials when sold in the form originally received by the seller was that established by any dollars-and-cents maximum price regulation applicable to the sale. Where no such regulation was applicable, the seller could charge the delivered price which his supplier could have charged. In many cases under the original arrangement, especially where maximum prices were established on a delivered basis or where the seller was shipping towards a basing point, freight absorption caused a substantial reduction in the seller's net return on a sale.

This procedure is now changed. Amendment No. 1 to Regulation No. 204 (Idle or Frozen Materials Sold Under Priorities Regulation No. 13), effective Sept. 16, now provides that idle and frozen material which is in the form originally purchased may be sold as follows:

1. If sold to a producer of the same or a similar material, the maximum price is any price that the seller and buyer agree to.
2. If sold to any other authorized buyer the maximum price, f.o.b. the present location of the material, is determined by using the delivered cost, including all transportation charges that the seller would be permitted to incur for the material if purchased from his original supplier under the presently applicable maximum price regulation.

If the quantity being disposed of is smaller than that originally purchased, the seller must compute his maximum prices on the basis of the quantity which was purchased and not the quantity being sold.

If the seller cannot identify the quantity originally purchased, the quantity last purchased shall be considered as the quantity originally purchased.

Where the original supplier has no maximum price, the holder may use his actual delivered cost as his maximum price f. o. b. present location of the material.

The new pricing procedure is designed to speed voluntary liquidation of idle and frozen materials by permitting the seller to pass on to the buyer the transportation charges from seller's to buyer's location.

On items such as iron and steel, copper, and many other materials, the procedure should be especially helpful. It has been pointed out that a holder of idle or frozen materials who refused to sell voluntarily and forced the Government to employ its requisitioning powers under the old procedure might actually be able to realize a larger return in the requisitioning proceedings in some instances than he could by voluntary sale.

OPA stressed that the new procedure cuts across all OPA regulations which establish dollars-and-cents maximum prices for sales by any person. For example, Revised Price Schedule No. 15 on copper provides that the maximum price for sales of electrolytic copper in carload lots is 12c, delivered Connecticut Valley points, plus or minus the differentials normally prevailing Aug. 11, 1941, for delivery to other points. Under that schedule if a person holding 50 tons of frozen electrolytic copper at Waterbury, Connecticut, sold the copper to a buyer in Rome, New York, considered for pricing purposes as a Connecticut Valley point, the maximum price delivered at Rome would be 12c with the seller being forced to absorb the freight from Waterbury to Rome. Under the new procedure provided in Amendment No. 1 to Maximum Price Regulation No. 204, however, the holder of the copper would be permitted to charge the buyer 12c, f. o. b. Waterbury, passing on to the buyer the freight from Waterbury to Rome.

•

Price Exceptions

• • • **Northwestern Motor Co.**, Eau Claire, Wis., applied for a higher price on its railway motor cars, equipped with a Ford V-8 motor. OPA permitted a $60 per unit increase in Amendment 18 to Schedule No. 136.

Brush Beryllium Co. was given OPA permission to pay a premium price for certain kinds of copper chips. The action constitutes an exception to Price Schedule 12.

Navajo Fluorspar Mines has been given a price exception on an acid grade of fluorspar. In two other exceptions under Price Schedule 126, OPA has determined maximum prices for ceramic and acid grades produced by James W. Patton Co. which had not been offered for sale Jan. 2, 1942. OPA has also approved a price for an acid grade of Indiana Metals Co. which was not offered for sale Jan. 2.

•

Castings Defined

• • • **OPA announced** Sept. 18 that the definition of steel castings, Revised Price Schedule No. 41 (Steel Castings), has been changed to make it clear that it covers both rough and machine castings.

Amendment No. 3 to the Schedule, effective Sept. 24, states that "steel castings" means cast steel objects "whether rough or machined." Previously the words "whether rough or machined" did not appear in the definition.

OPA pointed out that machining operations on a casting performed by the foundry making the casting are covered by Revised Price Schedule No. 41. Machining operations on castings performed by persons other than the original producer are priced under Maximum Price Regulation No. 136 (Machines and Parts and Machinery Services).

•

Ford Tractor Prices Up

• • • **Ford Motor Co.** was granted permission to increase the price of its agricultural tractor (Ferguson System) by $60, f.o.b. factory.

This price is for the tractor as designed and equipped on March 31, 1942, but with specification changes brought about by substitution of steel for rubber-tired wheels.

•

Nail Seller Aided

• • • **Nichols Wire & Steel Co.** of Davenport, Ia., was granted permission by OPA to charge a base price of $2.80 per hundred pounds for wire nails sold directly to consumers. This represents an in-

crease of 25c. per hundred pounds over Nichols' ceiling price of $2.55 for wire nails. The ceiling price of $2.55, however, is to be continued for sales to warehouses, jobbers, dealers or other persons for resale.

The price increase was granted because Nichols' ceiling prices were not adequate to cover nail manufacturing costs, exclusive of overhead. The higher price is authorized in Order No. 22 under Revised Price Schedule No. 6, effective Sept. 21.

•

OPA to Ration Farm Machinery

Washington

• • • **WPB Chairman** Donald M. Nelson has delegated to OPA authority to ration farm machinery and equipment with the further right to redelegate the authority to the Department of Agriculture. Supplementary directive L-1-k, issued on Monday by the director general for operations, gives OPA authority to ration all types of farm machinery and equipment or to turn the rationing control over to the Department of Agriculture.

The directive does not apply to repair parts and also excludes automobiles, trucks, tracklaying tractors, equipment ordered by the Department of Agriculture or other government agencies and other items which do not lend themselves to rationing.

•

Reject Ceilings May Cut Sales Income by 1.5 Per Cent

Pittsburgh

• • • **The imposition** of a new price ceiling on the sale of steel rejects will have a definite effect on total steel sales income and some sources here figure the reduction in sales dollar volume might approximate 1.5 per cent.

Steel rejects, wasters and waste wasters constitute about 10 per cent or more of the total steel sold and it is estimated that prices allowed under the new price ceiling for those items will represent reductions in about half the tonnage covered by the new ruling. Most of the reductions in price will come in those items classed as rejects and which includes bars, plates, tube rounds, semifinished steel, rejected sheet steel, etc. Wasters and waste wasters have always been sold at a discount but the other items for some time have commanded the same price as prime products.

Some observers believe that the reduction in the price of rejected billets and other semifinished steel may result in some of this material going back into the open hearth. The new ceiling price on some rejected semifinished steels is not much more than is being paid for remote heavy melting scrap. Furthermore, the charging of rejects back into the furnace would mean that that much more prime steel could be made, especially in view of the high quality scrap such rejects would make.

•

MRC Extends Purchase Time

Washington

• • • **With a view** to further stimulation of domestic production, the Metals Reserve Co., has extended to Dec. 31, 1943, the terms and provisions of its June 1 circular concerning the purchase of small lots of chrome and manganese ores. Such ores may be delivered by truckload. Subject to the provisions of the circular, shipments will be accepted by the Government agency at purchase depots established at numerous points in the United States.

•

18 Jobbers Invited to Serve on OPA Committee

Washington

• • • **Price Administrator** Henderson has invited 18 warehousemen and jobbers to become members of a Steel Warehouse and Jobbers Advisory Committee which will serve as a liaison body between OPA and resellers of iron and steel products.

The committee has been created to weigh any problems which may arise with respect to the prices that jobbers and warehousemen may charge, price regulations, their form, or classifications, differentiations, and amendments and adjustments under OPA pricing provisions. In keeping with the terms of the price control act, the committee will be purely advisory. The committee may make such recommendations to OPA on industry problems as it deems advisable.

Those invited to serve on the committee are:

A. W. Herron, Jr., Jones & Laughlin Steel Corp., Pittsburgh; Everett D. Graff, Joseph T. Ryerson & Son, Inc., Chicago; Leslie Worthington, Scully Steel Products Co., Chicago; Richmond Lewis, Charles C. Lewis Co., Springfield, Mass.; William G. Carter, Faltoute Iron & Steel Co., Newark, N. J.; Peter Cappio, Bushwick Iron & Steel Co., Brooklyn; Leslie Edgcomb, Edgcomb Steel Corp., Philadelphia; C. H. Bradley, W. J. Holliday & Co., Indianapolis, Ind.; Henry Neef, Gate City Iron Works, Omaha, Neb.; Phil Pidgeon, Pidgeon-Thomas Iron Co., Memphis; Frederick H. Lovejoy, Wheelock, Lovejoy & Co., Inc., Cambridge, Mass.; A. T. Galbraith, Crucible Steel Co., New York; A. C. Castle, A. M. Castle & Co., Chicago; H. M. Tayler, Tayler & Spotswood Co., San Francisco; J. F. Rogers, Beals, McCarthy & Rogers, Inc., Buffalo, N. Y.; Walter Doxsey, American Steel Warehouse Association, Inc., Cleveland; Rufus Lea, Woodward, Wight & Co., Ltd., New Orleans, La., and Sam Friedman, the Nottingham Steel Co., Cleveland.

•

Northwestern Steel Aided

• • • **Among** OPA actions recently were the following:

Northwestern Steel & Wire Co., permitted to charge $41 per gross ton, f.o.b. mill on rerolling billets for lend-lease.

Oliver Iron & Steel Corp., permitted to: Calculate delivery charges for track bolts to be shipped from Pittsburgh to Sidney, Nebr., under Appendix C (1368.14) of Maximum Price Regulation No. 147 from Pittsburgh as an emergency basing point; Calculate delivery charges for 3000 track bolts to Springfield, Ill., from Pittsburgh as an emergency basing point; Calculate charge on track bolts to Tampa, Fla., from Pittsburgh as an emergency basing point; Add to maximum price for lag screws shipped from Pittsburgh to Hooks, Tex., an amount equal to the difference between the less-than-carload lot freight actually charged on such shipment and the freight that would have been charged on such shipment if it had been part of a carload lot.

•

Electrolytic Plate $4.50

Pittsburgh

• • • **The small amount** of electrolytic tin plate now being sold is priced at $4.50 per base box f.o.b. Pittsburgh and Gary. This includes unassorted sheets. It is understood this base price was filed with the OPA several weeks ago and is now being quoted by those manufacturers who are in a position to furnish electrolytic tin plate. In the beginning very few customers were utilizing electrolytic tin plate because of the small quantity made.

New Super Rating Established For Urgently Needed War Material

Pittsburgh

• • • **Late last week** WPB advised steel companies by wire that any orders bearing the new PD-637 were to be filled without question and without regard to any other rating allocation, directive, or instruction.

It was said that nothing supersedes orders carrying the PD-637 which now becomes the super expediting vehicle to make sure that urgently needed steel supplies which may be a bottleneck in some war effort will reach the scene as soon as they can be made.

Steel plants were warned not to question these instructions and not to attempt to confirm them at Washington WPB. They were told to tell the WPB Iron and Steel Branch at Washington what material was covered in the PD-637 order, when it was to be shipped, and what tonnage, if any, it displaced on rolling mill schedules.

If this new expediter is used sparingly and only when absolutely necessary, it will have no serious effect on mill schedules. However, if the power of PD-637 is indiscriminately used, it will serve to neutralize and upset rolling mill schedules made up from Washington quotas or directives which are issued each month.

It is believed that PD-637 will accompany only those steel orders which are so urgently needed that non-delivery of this material at once would seriously hamper the war effort. In effect this new priority rating becomes the "ace in the hole" since it supersedes everything else.

•

Methods Outlined for Assignment of Ratings

• • • **Following** the announcement of the policy under which preference ratings are to be issued only by WPB officials, WPB has gone one step farther and issued instructions covering the assignment of preference ratings to military and other government orders.

The methods were outlined in an announcement of Priorities Directive No. 2 by the Director General for Operations.

Recommendations for ratings will continue to be initiated by the procurement officers. The directive provides interim methods for approval of ratings assigned to individual contracts on Form PD-3A, to construction projects on forms in the P-19-h series, and of re-rating directions on Form PD-4K, pending establishment of a complete system of review by revision of administrative orders and instructions. Included among the ratings to be reviewed are those assigned to Lend-Lease orders placed by or for a foreign government.

Following counter-signature by the appropriate service officer, WPB will check ratings assigned to see that they are in compliance with military priorities directives and instructions of the Army and Navy Munitions Board and with WPB regulations, administrative orders and instructions. In case of disagreement as to interpretation, the question will be reviewed as the Director General for Operations may direct. In disputed cases, the decision of the Deputy Director General for Priorities Control will be final.

Excepted from the above are ratings assigned in the following circumstances:

(a) When the total value of the delivery or deliveries rated by the instrument does not exceed $500. Purchases shall not be divided for the purpose of making this exception available.
(b) When the countersigning by an Army or Navy officer takes place outside of the forty-eight states and the District of Columbia.
(c) When the rating is assigned directly to a purchase made by a Post Exchange or ship's service store.
(d) A purchase made pursuant to approval given by a commanding officer, commandant, or the Bureau of Supplies and Accounts of the Navy, or by a commanding officer of a defense command of the Army, in an emergency where the degree of urgency is such that advance approval by a WPB official cannot be obtained, provided that in each such case a copy of the rating document is mailed to the Director General for Operations within 24 hours after issuance.
(e) In such other cases as may be excepted, either individually or by classes, by or under written authority of the Director General for Operations.

Military construction, defined as the construction of facilities which will be owned and operated for the Army, Navy or Maritime Commission, and airport and other aircraft facilities to be built or owned by the Civil Aeronautics Authority for the use of the Army or Navy, is to be rated by an order in the P-19-h series, following application on a form in the PD-200 series. The application will be countersigned by the Army and Navy Munitions Board and must be approved in writing by an authorized official of WPB before issuance. All construction other than military construction will be rated only by WPB.

Excepted from the above is "command construction," ordered by the Chief of Staff, United States Army, or the Chief of Operations, United States Navy, to be built under contract let by the Corps of Engineers or the Bureau of Yards and Docks including construction of facilities for the repair or manufacture of finished items of munitions, having a value of less than $500,000, and emergency flood control projects costing less than $100,000. Such construction will be rated by procurement officers on Form PD-3A and the ratings approved by WPB.

•

Code Revived Again

Washington

• • • **After being counted out** several times by WPB officials who objected to the Production Code or Allocation Classification System because they thought it would be superfluous when the PRP is put on a product basis in the first quarter of 1943, the Code has been revived again. Certain groups in WPB are determined to continue with the Code in spite of the fact that it will take three months to tabulate the information which at that time will not be current enough to be of any value. The reason for this determination seems to be that WPB officials are not willing to be embarrassed by admitting a mistake but instead will insist on business furnishing data which WPB will not put to any use.

If the Production Code is finally approved, steel warehouses will not be required to comply with the regulation. Indeed, one spokesman has said that the procedure may be established if the Code is approved to grant exemptions to industries which feel that com-

pliance with the regulation would work undue hardship.

•

Action on Hand Tools

Washington

• • • **WPB last Thursday** issued simplification schedules covering saws, hatchets, adzes and light hammers. These simplification requirements, designed to concentrate production on fewer lines and thus release materials and productive facilities for the war effort, are contained in Schedule II and III to the hand tools simplification order L-157.

•

Order M-89 Amended

Washington

• • • **Order M-89,** controlling allocation and use of corundum, was amended last Wednesday by WPB to include control over use of corundum in the hands of consumers, and to write into the definition of material covered by the order corundum ores and corundum superfine flour. Corundum is an important industrial abrasive.

Two new forms, PD-294 and PD-294A, are to be used in complying with the order's reporting provisions, in addition to Form PD-293 which was used under the old order.

•

PD-25F Deadline

Washington

• • • **Last Saturday** was the deadline for consideration of PD-25F interim applications for the third quarter, under PRP. J. A. Krug, Deputy Director General for Priorities Control, pointed out that acceptance of these applications was terminated on the date named because it would be impossible in virtually all cases for a company to receive authorization to order additional materials on the interim application and actually obtain delivery before Oct. 1.

•

Order P-46 Amended

Washington

• • • **Designed to** expedite installation of defense utility facilities, WPB has amended Order P-46. The amendment provides that suppliers of utility services to projects rated A-5 or better which require iron, steel or copper for their construction will be granted the highest rating assigned to other equipment for the project which also uses iron, steel or copper. All other required utility facilities will be assigned the lowest rating granted to materials for the project so long as the rating is not below A-5.

Ignorance of Priorities Held Not Valid Excuse

• • • Priority orders being violated most frequently in New York State and Northern New Jersey were reported this week by Sydney Hogerton, chief deputy regional director, to include the following:

M-9-A and M-9-C, governing copper; L-41 and L-41-A, controlling building and building construction; M-15-B and M-15-F, regulating the use of rubber goods; M-126, governing the use of iron and steel in many products.

Mr. Hogerton estimated that perhaps half of the 2000 complaints investigated by office since last May were caused by ignorance on the part of business men. He warned that ignorance no longer can be excused.

•

Survey of Compliance

Washington

• • • **Federal Trade** Commission attorney-examiners and WPB representatives have been assigned to the field work of a survey of the operations of 280-odd manufacturing users of tin. The purpose of the survey, WPB said, is to determine their degree of compliance with WPB orders issued to conserve tin.

•

Metal Doors Restricted

Washington

• • • **Production of** metal doors, metal door frames and metal shutters for military or civilian use was prohibited by WPB in Order L-142, issued last Wednesday. Previously manufacture of these products for civilian use had been controlled by the denial of preference rating applications for metal except for essential uses. In 1941 approximately 120,000 tons of steel were consumed in production of metal doors, frames and related items.

The order halts all production except for fire doors meeting certain maximum specifications and for airplane hangar doors. Manufacturers are permitted to fill orders received prior to the issuance of L-142, provided that the door, frame or shutter is intended for a rated building or project already under contract, and provided that the door, frame or shutter can be completed in 45 days. Manufacture of doors, frames or shutters on an A-10 or higher rating for repair and maintenance purposes is also permitted by the order.

Metal shutters covered by the order refer to means of closure in the side, floor, ceiling or partition of a building, shaft or tower, but not to windows or window shutters, which are covered by Order L-77.

•

Order L-197 Amended

Washington

• • • **In order to** give manufacturers sufficient time to change their dies, Order L-197 on steel shipping drums has been amended to postpone until Oct. 1 the effective date of a provision requiring the letter "X" to be plainly embossed on the bottom plate of new drums. Drums sold or delivered after Sept. 14 must still be legibly marked in some manner with an "X".

The order, issued Sept. 14, required the embossing of new drums in this manner because of another provision which permits the continued use of drums for a limited number of products, provided that the drums are owned by or in the possession of the packer. Since new drums or drums delivered after the effective date of the order are not permitted for these products, the order required the use of the letter "X" as an aid in distinguishing between drums on hand and drums manufactured or sold after Sept. 14.

Officials of WPB's containers branch estimated an annual saving of 100,000 tons of steel and the release of thousands of drums for essential purposes as the result of L-197, which prohibits the use of new or second hand steel shipping drums for packing approximately 200 food, chemical and petroleum products. The order also prohibits the packing of any product on an additional list of approx-

imately 35 items in a new or used drum.

Restrictions of the order do not apply to persons having less than five drums in use for any purposes, or to drums used for the sale and delivery of commodities to the Army and Navy and certain other designated government agencies.

•

Needed: Drive Gears for Tank Transmissions

Chicago

• • • **An urgent need for** final drive gears for tank transmissions was made known this week by the local War Production Board. These parts are needed in quantities of from 25 to 50.

Machines which will probably be required for this work are a radial drill with 36 in. arm, a 30 x 60 in. engine lathe and an 18 x 5 in. internal gear shaper. The prime contractor supplies funnel-shaped rough forgings weighing about 200 lb. each. The part is machined all over.

Plants with facilities for handling this type work are requested to get in touch with V. J. Mohler of the Chicago WPB.

•

Ratings for Oil Industry

• • • **A-1 and A-2** preference ratings have been assigned to deliveries of all materials used in the production branch of the oil industry and those used for maintenance and repair purposes or as operating supplies in other branches of the industry, under Order P-98-b, which was issued Sept. 15. Operators will continue to use Form PD-200 to obtain preference ratings. The new order, effective until Jan. 1, 1943, supplants Order P-98.

•

Order on Lighting Fixtures

• • • **Manufacture** or sale of blackout and dimout lighting fixtures which do not conform to specifications of the War Department, Navy Department, and the Maritime Commission is prohibited by a new order, effective Sept. 18. The order, L-168, also lays down conditions under which approved fixtures—street and highway lights. traffic signals, flash lights, lanterns and other equipment intended for use in blackouts and dimouts—may be sold.

•

Suspension Order Issued

Washington

• • • **Under** suspension Order S-90, Max Ziegler & Bros., Inc., Muncie, Ind., scrap metal dealers, are prohibited for a period of six months from purchasing, accepting or delivering any copper scrap, with the exception of scrap recovered in two wrecking operations in which they are currently engaged.

All priority assistance and allocations of restricted materials are withdrawn from the Florida Pipe & Supply Co., Jacksonville, Fla., for a period of three months. Suspension Order S-100 charges that this company delivered 3,000 ft. of copper tubing on orders bearing preference ratings lower than A-1-k, in contravention of WPB regulations.

Federal Grand Jury indictments were returned Sept. 15 charging three men associated with the Tyne Co., Chicago, with improperly extending priority ratings and issuing false certifications to obtain large amounts of metal vitally needed in the production of war material.

Lawrence Woodworking Co., Lawrence, Mass., was penalized for priorities violations by Suspension Order S-98.

Reliable Tool & Wire Products Corp., New York, and Louis Rubin, the corporation's president, were denied all priority assistance in allocations of scarce material for 60 days by WPB, it was announced on Monday. The company and its president were charged with violation of WPB regulation. It was alleged that Mr. Rubin, acting on advice which he had good reason to believe was eroneous, applied the A-10 rating provided for repair, maintenance and operating supplies to purchase orders for approximaetly 6 tons of steel wire. This wire was ordered for the manufacture of hooks used in the assembling of dolls.

In addition to the denial of material for the 60-day period, the suspension order restrains Rubin and Reliable Tool & Wire Products Corp. from purchasing, processing and selling any steel wire until Nov. 21.

New Priorities Guide Will Be Ready Oct. 8

• • • Another Priorities Guide being prepared by THE IRON AGE is scheduled to appear in the Oct. 8 issue. It will include new material and revisions. The last Guide was issued June 4. The new Guide will be the seventh in a series.

Since the demand always exceeds the supply, advance orders for copies of the Guide are now being taken. The price schedule follows:

1 to 10 copies.....50c. each
11 to 100 copies.....40c. each
101 to 300 copies.....35c. each
300 or more copies.....30c. each

Stamps or coin with orders for $2 or less would lighten our load.

•

Order L-163 Amended

Washington

• • • **The WPB** last Friday amended Order L-163, covering the production and distribution of turbo-blowers, to include a wider range of machines. The new definition, which is stated in Amendment No. 1 to Order L-163, brings additional types of turbo-blowers within the terms of the order. The amendment is effective Oct. 1.

•

Tracklaying Tractors

Washington

• • • **In order to avoid** unnecessary cross-hauling, the WPB last Friday issued an interpretation of Supplementary Order L-53-b, governing the production and distribution of parts of tracklaying tractors, so that repair parts may be shipped directly to a consumer. Interpretation No. 1 states that a producer may ship parts directly to a consumer on behalf of a distributor or dealer who is authorized under the terms of the order to make such a delivery.

•

Chemical Producers Aided

Washington

• • • **Chemical producers** were granted new higher preference ratings to enable them to obtain maintenance, repair, and operating supplies by Amendment No. 3 to Preference Rating Order P-89, issued Sept. 19. It raises to A-1-a

the rating assigned to the industry for obtaining all metals appearing on List No. 1 of Form PD-25 A for the fourth quarter. A similar rating is assigned to fabricated parts and equipment having a unit cost of $250 or less. All other materials needed for maintenance, repair, and operating purposes are assigned an A-1-c. To repair plant breakdowns and avoid threatened curtailment of production in emergencies, the amendment provides for the assignment of ratings higher than A-1-a upon application, by letter or telegram to WPB, stating all pertinent data.

•

Action on Armored Cable

Washington

• • • **WPB on Saturday** ordered manufacturers of armored cable to cease production within 30 days to aid in the conservation of steel. This provision is contained in Order L-165 which also prohibits the acquisition of raw materials for use in the manufacture of armored cable after Sept. 24. Approximately 30 manufacturers are affected by the order but since none make armored cable exclusively, no companies are expected to be forced out of business.

•

Form PD-200 to Be Used

• • • **Applicants** requesting priorities assistance or authorization to begin construction under provisions of the stop-construction order, L-41, must use the revised Form PD-200 after Sept. 30. Beginning Oct. 1, applications on the old PD-200 form, which has been in use since last December, will not be accepted.

•

Electronic Devices

• • • **Electronic devices** involving the use of vacuum or gaseous tubes will be brought under further control. Limitation Order L-183, effective Oct. 3, covers considerably more ground than L-44, issued last spring, which prohibits only the manufacture of civilian radio receiving sets. Although none of the provisions of the latter order is affected, the new order extends coverage to everything else used in the electronic field from microphones to antennae, and including tubes, parts and complete equipment.

It provides that no one may manufacture, fabricate, assemble or produce electronic devices in excess of a minimum inventory required to meet deliveries on orders rated A-3 or higher. Inventories are permitted up to a 45-day supply, but may not in any case exceed 12½ per cent of total 1941 sales. Specifically excepted from the provisions of L-183 are electronic devices used in hearing aids, telephone and telegraph equipment, medical and therapeutic equipment and light and power equipment.

•

Emergency Plan Set

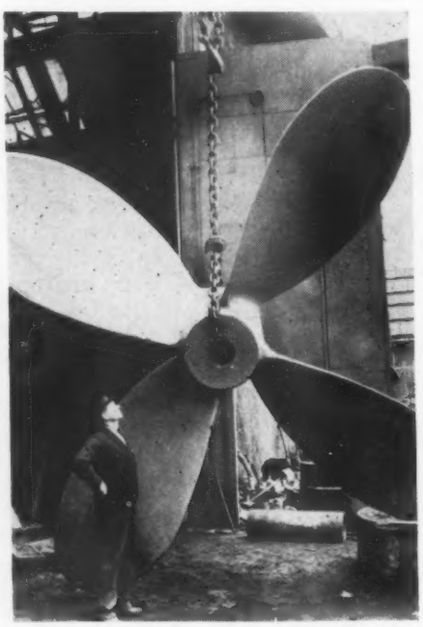
Washington

• • • **To prevent stoppages** or slow downs in essential production that might arise from lack of small amounts of critical materials, WPB on Tuesday said that it had authorized its regional offices to assign high preference ratings for the use of earmarked materials in emergencies. Only 10 of the 23 materials may be authorized during the first month. They are: Aluminum, brass, refined copper, lead, nickel, pig iron, scrap, assorted structural steel, other steel except plate and zinc. Other materials to be included in the plan later are: Cadmium, ferro-chrome, cobalt, cork, formaldehyde, molybdenum, crude rubber, synthetic rubber, tantalum ore, titanium ores, tin, tungsten and vanadium.

Under this regional Emergency Materials Plan, preference ratings up to AAA to avoid positive losses of essential production and up to AA-2X may be assigned for other emergency cases. The quantities of materials against which such preference ratings may be assigned in the aggregate each month, are not to exceed a small specified percentage of the available supply of each material.

Suppose, for instance, completion of a ship is being held up because a small amount of steel is needed for a critical part. If it is impossible to obtain the steel in any other way, the WPB field officer may assign whatever emergency rating is necessary to assure its immediate delivery. With the way cleared for the part to be made, the ship can be delivered without delay.

NEWS IN PROPELLERS: This huge 10-ton propeller, cast in a single unit by the Washington Iron Works, Seattle, represents one of the first propellers to be produced under the new Maritime Commission specifications which classify meehanite as a suitable metal for this purpose. Use of meehanite is said to be relieving the production delays caused by the tin and copper shortages necessary in the making of manganese bronze propellers.



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Try Field Offices First

Washington

• • • **WPB on Tuesday** urged business men that whenever they wish to obtain information from WPB they should go to their regional or field offices before coming to Washington. "We have 12 regional and 127 field offices throughout the country," the announcement said.

•

Ban on Heaters Lifted

• • • **Restrictions** on production of gas unit heaters were removed by Amendment No. 1 to Limitation Order L-173. The order originally issued Aug. 5 curtailed production of domestic space heaters using fuel oil and gas.

•

Aviation Corp. Opens New Airplane Parts Plant

Toledo

• • • **Newest industry** to be located here is the Northern Aircraft Products Division of Aviation Corp.

This Week's Priorities and Prices

Production Foundry Co., Oakland, Cal., is charged with unauthorized and specifically disapproved deliveries of aluminum and is prohibited from accepting any deliveries for three months. (WPB-1811)

Truck firms have been reminded that a report must be filed on any change in the inventory status of a vehicle covered in the inventory taken by WPB as of July 31. (T-850)

Cincinnati Planer Co., Cincinnati, has been granted permission to charge higher prices for boring mills and parts manufactured for it by two sub-contractors.

National Emergency specifications for the design, fabrication and erection of structural steel for buildings have been established by the War Production Board. (WPB-1832)

Automotive replacement parts, subassemblies and accessories designed for civilian use have been placed under the Machines and Parts Regulation No. 136 by Amendment No. 16, effective Sept. 29. (OPA-683)

Overhead traveling cranes are subject to direct production supervision and allocation by WPB under Order M-225. (T-841)

Hand tool simplification schedules have been extended by Order L-157, issued 9-17-42. (T-881)

Steel castings mean cast steel objects "whether rough or machined" according to Amendment No. 3 to Revised Price Schedule No. 41, issued Sept. 18. (OPA-744)

Applicants requesting priorities assistance or authorization to begin construction must use the revised form PD-200 after Sept. 30. (WPB-1873)

Armored cable production is prohibited after Oct. 19 by order L-164 issued Sept. 19. (WPB-1878)

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For copies of above announcements address Office of War Information, Washington, giving announcement number as shown in parentheses after each paragraph. (*For example,* WPB-600 *means announcement* 600 *issued by the War Production Board.*)

Revisions to The Iron Age Priorities Guide

• • • The following data, together with all intermediate weekly revisions in THE IRON AGE, should be added to THE IRON AGE Priorities Guide published with the issue of June 4 to bring the Guide up to date.

"M" Orders:

M-198...Places cryolite under complete allocation (9-18-42).

"L" Orders:

L-28-a...Orders simplification of production of light bulbs and lamps to cut down inventory stocks carried by sellers (9-17-42).

L-53-b...Interpretation No. 1 (9-18-42) provides that repair parts for tracklaying tractors may be shipped directly to a consumer.

L-142...Prohibits production of metal doors, metal door frames and metal shutters for military or civilian use (9-16-42).

L-157...Gives simplification schedules covering saws, axes, hatchets, and other hand tools (9-17-42).

L-163...Amendment No. 1 (9-18-42) includes a wider range of machines.

L-165...Prohibits manufacture of "armored cable," commonly referred to as "BX" cable (9-19-42).

L-168...Prohibits manufacture or sale of blackout and dimout lighting fixtures which do not conform to specifications of the War Dept., Navy Dept. and the Maritime Commission, effective Sept. 28 (9-17-42).

L-173...Amendment No. 1 (9-19-42) removes restrictions on production of gas unit heaters, adaptable for economical heating of war plants.

L-183...Further controls electronic devices involving use of vacuum or gaseous tubes (9-18-42).

L-197...Amendment No. 1 (9-16-42) postpones until Oct. 1 the effective date of a provision requiring the letter "X" to be plainly embossed on the bottom plate of new drums.

"P" Orders:

P-98-b...Assigns ratings of A-1-a and A-2 to deliveries of materials used in the production branch of the oil industry (9-16-42).

Republic 9 Month Ingot Output Beats 1940 Mark

Cleveland

• • • **With nearly 3½ months** still remaining in 1942, the steel ingot production of Republic Steel Corp. exceeded the total production for the entire year of 1940 last Sunday, and unless raw material shortages become considerably more serious, there is a possibility that Republic will substantially exceed its 1941 ingot production, which constituted an all-time record, according to C. M. White, vice president of operations.

Ingot production for 1940, a record for Republic up to that time, amounted to more than 6,100,000 tons. This tonnage, it was pointed out, compares with the last reported 7,200,000 tons annual production of Japan.

WLB Grants Pay Raise to ALCOA Forgers and Helpers

Cleveland

• • • **Bonus and piece work rate** increases of 20 and 10 cents an hour, based on 100 per cent efficiency have been awarded to 600 hammer men and helpers, respectively, at the Aluminum Co. of America plants in this area, according to a War Labor Board directive. The raises were granted to narrow the differences in pay between these Aluminum workers and steel forging workers, and the raises were granted retroactive to July 22.

Aluminum forgers will now be earning about $1.65 per hour, compared with the $2.10 paid steel forgers, and helpers' earnings are scaled in about the same ratio. The rate adjustments were recommended by W. W. Dawson, WLB referee and professor of law at Western Reserve University, who felt that a differential was warranted, but not one so great as existed.

Trade Notes

Smith Tool Works, Inc., Bucyrus, Ohio, has changed its name to Smith Tool & Engineering Co. The Smith Incubator Corp., will be retained as a subsidiary, with its activities confined solely to incubator sales.

•

Directors of Ferro Enamel Corp., Cleveland, have authorized acquisition of all outstanding stock of W. B. Lawson, Inc., of Cleveland. W. B. Lawson, Inc., was organized in March, 1940, to deal in industrial chemicals, oils, and non-ferrous metals. The company distributes for American Potash & Chemical Co. (borax and boric acid); Duquesne Smelting Corp. (non-ferrous metals, zinc dust); Ferro Drier & Chemical Co. (driers and metallic soaps); Michigan Alkali Co.; Philadelphia Quarts Co. (silicates); Stauffer Chemical Co. (sulphur); Tennessee Corp.; Virginia-Carolina Chemical Co. and others.

PERSONALS . . .

• **M. B. Sheik,** heavy construction executive, has been appointed project manager by the Columbia Steel Co. for the construction of the $150,000,000 Geneva Works in Utah for the Defense Plant Corp. **E. M. Barber** is vice-president in charge of the project. **R. C. Talbott,** who has been temporarily in charge at Geneva, resumes his regular duties as resident engineer.

• **Russell L. Peters,** formerly executive Secretary of the Illinois Public Aid Commission, was appointed assistant treasurer of the company. Mr. Peters at one time served with Arthur Andersen & Co.

• **A. G. York,** formerly assistant to the president and managing director of the Forged Steel Fittings Division of the Watson-Stillman Co., Roselle, N. J., makers of hydraulic machinery and equipment, has been appointed vice-president in charge of sales for the entire company. He fills the vacancy created Aug. 28 by the resignation of **J. C. Grindley** as sales manager of the Hydraulic Machinery Division, due to ill health.

The board announced that for the immediate future no successor would be named to Mr. York's position as managing director of the Forged Steel Fittings Division. Other appointments announced include **R. W. Dinzl,** vice-president in charge of engineering; **F. H. Stillman,** assistant to the president and assistant secretary; and **William Woidt,** assistant secretary.

• **Thomas D. Jolly,** chief engineer and director of purchases, and **M. M. Anderson,** personnel manager and director of labor relations, have been made vice-presidents of the Aluminum Co. of America, Pittsburgh.

Mr. Jolly began his career with the company in New Kensington. In 1929 he was moved to Pittsburgh and was made purchasing agent in 1931. In 1937 he became chief engineer and director of purchases, and in addition, is a director of several of the subsidiary companies. Mr. Jolly at the present time is in charge of the company's Defense Plant Corp. construction program, through which the company is building 21 aluminum plants for the government. He is a member of the American Society of Mechanical Engineers and past president of the National Association of Purchasing Agents.

Mr. Anderson, in addition to his duties as personnel manager, has been in charge of the company's labor relations for a considerable time. He is a past president of the Pittsburgh Personnel Assoc. and has been active in labor relations and personnel matters with various national organizations.

• **C. E. Werner,** sales representative for SKF Bearings, Inc., at Milwaukee, for the last two years, has resigned to become chief engineer of the J. W. Hewitt Machinery Co., Neenah, Wis. He is an active member of the Milwaukee chapter of industrial advertisers and formerly was sales engineer for the Galland-Henning Co., Milwaukee.

• **Frank J. Kevlin** has been named traffic manager of The Falk Corp., Milwaukee. Mr. Kevlin has been handling the traffic work for Falk for a number of years and in addition will act as manager of the shipping department.

• **Walter L. Maxon** has been appointed manager of the Allis-Chalmers Manufacturing Co.'s crushing cement and mining machinery department, succeeding **Herman Schifflin,** who is retiring.

Before entering the employment of Allis-Chalmers in 1927, Mr. Maxon was a professor of metallurgy at the Colorado School of Mines, and also served as a consulting engineer. In 1940 he became sales manager and chief engineer of the Allis-Chalmers mining machinery division.

Mr. Schifflin had been manager of the department since its creation in 1926; he first became manager of the cement machinery division in 1907.

• **Crispin Oglebay,** president of Oglebay, Norton and Co., Cleveland, was elected a director of the Baltimore and Ohio Railroad Co. Sept. 16. Mr. Oglebay was graduated from Yale University in 1900, and began his business career at Kansas City, as a clerk. In 1903, he moved to Cleveland to become secretary of the Hoffman Hinge and Foundry Co., and in 1906, when that organization became the Ferro Machine and Foundry Co., Mr. Oglebay was made its president. He has been president of Oglebay, Norton since 1924.

• **Harold E. Koch,** vice-president of the Hevi Duty Electric Co., Milwaukee, has been named president, succeeding the late **Edwin L. Smalley,** founder and president, who died Aug. 29. **George A. Chutter,** eastern district manager, and **Norman C. Bloye,** sales engineering department, have been named vice-presidents.

• **R. L. (Mike) Cain,** who for the past year served as a priority specialist for Westvaco Chlorine Products Corp., has joined the general sales department of Pennsylvania Salt Mfg. Co., Philadelphia, in the heavy chemicals division. He was previously in charge of sales and service for Westvaco in New York and at the same time served as divisional sales manager of Curtin-Howe Corp., Westvaco affiliate.

• **William T. Hedlund** of Summit, N. J., has been named president of the Elastic Stop Nut Corp., Union, N. J. Mr. Hedlund has been a director of the corporation. He was formerly vice-president of the Electrolux Corp., in charge of engineering. He is a graduate of Massachusetts Institute of Technology and of the New York University law school.

• **Raymond L. Dharte** has been appointed purchasing agent of Detroit-Michigan Stove Co., Detroit.

• **Richmond Lewis,** one of the two New England men named to the steel warehouse and jobbing advisory committee, is president of the Springfield warehouse firm of Charles C. Lewis Co.

• **Herbert J. Burgess** has been made general superintendent in charge of manufacturing at the Westinghouse Electric & Mfg. Co., East Springfield, Mass. Mr. Burgess has been superintendent of the plants feeder division since 1937, and has been with the company since 1917. He is a native of Pawtucket, R. I.

• **P. D. Block, Jr.,** has been elected to the board of directors of Inland Steel Co. to succeed his father, the late P. D. Block. Mr. Block is assistant to the vice-president in charge of raw materials and the Inland line of ore freighters. He came to the company in 1928 after graduation from Yale University where he majored in Industrial Engineering. Mr. Block spent a number of years at the Inland ore mines and in practically every department of the mills at Indiana Harbor, before coming to the Inland Executive Offices, Chicago.

• **Desmond Sprague,** mechanical engineer, Sprague Specialties Co., North Adams, Mass., has been placed on the engineering staff of the Curtis-Wright Corp., Caldwell, N. J., propeller division.

• **Charles Marcus,** former group executive over Eastern Divisions, Bendix Aviation Corp., was named vice-president in charge of engineering throughout the corporation, and **D. O. Thomas,** former Western Group executive, was appointed vice-president of manufacturing in all Bendix plants. Mr. Marcus will be chairman of a newly-created general engineering committee, and also will direct operations of the new devices and patent group. **Malcolm P. Ferguson,** former general manager of Bendix Products Division, South Bend, succeeds Mr. Thomas as vice-president and group executive of the Western Group. **Raymond P. Lansing,** general manager of Eclipse Aviation and Pioneer Instrument Division at Bendix, N. J., has been appointed vice-president and group executive in charge of Eastern Divisions. Other promotions include: **Arthur E. Raabe,** former sales manager of Eclipse Aviation, becomes assistant general manager of Eclipse-Pioneer, and **Kenneth MacGrath,** formerly factory manager, has also been named assistant general manager. At Bendix Radio Division, Baltimore, **Hugh Benet** becomes general manager; at the Philadelphia division **N. B. McLean** has been appointed general manager; and in the marine division, Brooklyn and Norwood (Mass.), **G. W. Smith, Jr.** has been named general manager. At South Bend, **T. W. Tinkham,** formerly factory manager, has been made general manager of the products division, succeeding Mr. Ferguson. **A. A. Kucher,** is the new director of research and heads up a new research laboratory established in Detroit.

P. D. BLOCK, JR., who succeeds his father, the late P. D. Block, as a member of Inland Steel Co.'s board of directors.

• **Nelson M. Jenkins** has been appointed production superintendent at the Birmingham plant of Rheem Mfg. Co. Mr. Jenkins went with Rheem from the Tennessee Coal, Iron & Railroad Co., where he had been assistant superintendent in the tin house of the Tennessee company's tinplate mill.

• **F. Lloyd Woodside** was named president of the Park Chemical Co., Detroit, succeeding his brother **William Park Woodside,** who had been president since organization of the company in 1911, and who is now chairman of the board. For the past six years Mr. Woodside has been connected with the metallurgical research division of the Climax Molybdenum Co.

• **John S. Stanier** has been appointed a superintendent of the hot and cold strip mills of the Youngstown Sheet & Tube Co. located at Campbell Plants of the Company. Mr. Stanier succeeds **Albert S. Glossbrenner** whose appointment as superintendent of Youngstown Brier Hill Plant was made concurrently.

• **William L. Whitfield** has been named comptroller of Peter A. Frasse & Co., Inc., the Mortgage Commission Servicing Corporation, and other subsidiaries of the Mortgage Commission.

• **Herman S. Swartz** has been made regional specialist of the W.P.B.'s used construction machinery section. Mr. Swartz is a graduate of the Massachusetts Institute of Technology, class of 1928, has been an engineer on various bridge and tunnel projects and for seven years has been editor and publisher of the *New England Construction Magazine.*

• **Bradford C. Colcord,** formerly general superintendent, National Tube Co.'s National works, McKeesport, Pa., has been promoted to assistant vice-president—operations, with headquarters at the general offices in Pittsburgh. **Ralph M. Overton,** who has been assistant general superintendent of National works, was advanced to general superintendent of the plant. **O. P. Adams,** formerly superintendent of maintenance, National works, will become assistant general superintendent.

• **D. A. Sherick,** formerly of the Weirton Steel Co., Weirton, W. Va., has joined the metallurgical staff of the Babcock & Wilcox Tube Co. and will be production metallurgist of the Welded Tube Division, Alliance, Ohio, plant, the Babcock & Wilcox Co.

• **M. L. Samuels,** formerly of Battelle Memorial Institute, has joined the metallurgical staff of the Babcock & Wilcox Tube Co., Beaver Falls, Pa., as research metallurgist.

• **W. H. Bowden,** formerly with Abrasive Co., Philadelphia, has been named president of the Waltham Grinding Wheel Co., Waltham, Mass. Other new officers are **E. Paul Floyd,** who has been with Simonds Saw Steel Co., Fitchburg; **H. A. Johnson,** treasurer, formerly with Bonbright Co., New York, and **R. L. Lyons,** general manager, who has been associated for many years with the Waltham Company.

• **Robert P. Freehafer,** who has been assistant purchasing agent of the Carpenter Steel Co., has now been advanced to purchasing agent of the company.

• **R. R. Higgins** has been elected president of the Standard Tool Co.,

Cleveland, succeeding his father, the late H. A. Higgins. **E. E. Wegman** is secretary and **J. W. Bremer,** formerly auditor, is now treasurer. **Bert Conway,** formerly with General Motors, becomes vice-president and general manager, effective Oct. 1, succeeding **H. C. McKean,** recently retired on account of ill health. **W. P. Ross,** while continuing as sales manager, becomes acting vice-president.

OBITUARY . . .

• **Harry J. Sweeney,** chief metallurgist for Republic Steel Corp., Youngstown District, died Sept. 14, aged 38 years. Mr. Sweeney was formerly assistant superintendent of open hearths at the Carnegie-Illinois Steel Corp., in Homestead, Pa., before he came to Youngstown. He was also in charge of the metallurgical division of the chemistry department at Youngstown College and taught courses in metallurgy.

• **James Turner Gibson, Sr.,** superintendent of blast furnaces at Ensley Works of the Tennessee Coal, Iron & Railroad Co. from 1908 to 1910, died Sept. 17 at his home in Birmingham, aged 75 years. A native of Cowan, Tenn., Mr. Gibson was associated with Woodward Iron Co. and Gulf States Steel Co. in Alabama, after leaving the Tennessee Co. He had not been active in business for more than 20 years.

• **Harold Foster,** for many years tool steel salesman, Boston office, Bethlehem Steel Co., died at his home in Melrose, Mass., Sept. 15.

• **Edward A. Hurley,** vice-president and eastern manager of the Foundation Co., died Sept. 16 at his home in Quincy, Mass. He was largely responsible for the design of the Bethlehem-Hingham Shipyard and new Fore River Yards ways and wet slip. He became associated with the Foundation Co. in 1917.

• **Ervin A. Wolff,** vice-president and general manager of the Superior Mold & Iron Co., Penn, Pa., died Sept. 12, at his home in Wilkinsburg, Pa. Previous to his association with the Superior Mold & Iron Co., Mr. Wolff served as superintendent for the Pittsburgh Grey Iron Foundry Co. and the Bollinger-Andrews Construction Co. He was also a member of the American Iron and Steel Institute.

• **Edward Haight Younglove,** staff manager of Johns-Manville's Steel Industry Department, died suddenly in Chicago on Aug. 30. He was 63 years old and had been associated with Johns-Manville for 46 years. Mr. Younglove joined the J-M organization in Chicago in 1896 and rose through the ranks to the managerial post which he had held for the past several years. He was widely known in the industry and had made several contributions to the technology of steel production.

• **Otto Mueller,** managing director of the Pressed Steel Co., Oxford, England, died Sept. 13, according to word received here. He was 55 years old. Mr. Mueller was formerly associated with the Edward G. Budd Mfg. Co. in Philadelphia and Detroit and was sent to England by that company in 1926 to manage the Pressed Steel Co. He joined the Budd organization in 1921 as director of purchases, was transferred to Detroit in 1925 as manager of the Detroit division, and left from there for England. His last visit to the United States was in 1932.

• **Joseph F. Froggett,** widely known in the iron and steel industry and senior editor of *Daily Metal Trade,* died in Cleveland Sept. 11 after a brief illness. He was 72 years old. Mr. Froggett was raised in the shadow of the steel mills in Youngstown, where his father was a blast furnace superintendent for the Brown Bonnell Iron Co., now merged with the Republic Steel Corp. After studying law for a year in Youngstown, Mr. Froggett became a reporter on the Youngstown Telegram in 1890 and by 1906 was managing editor. After moving to Cleveland, he joined the *Plain Dealer* as a reporter, specializing on the street railway fight then in progress. Mr. Froggett entered the employ of the Penton Publishing Co. in 1908 as assistant to the editor of the *Iron Trade Review.* Shortly after the daily edition of the *Review* was established in 1909 he was named managing editor. Under his direction the original magazine format was discarded and it became a daily newspaper.

• **Carl C. Gibbs,** president of National Malleable & Steel Castings Co., Cleveland, died Sept. 9. He joined the National Malleable Co. in 1905 as a salesman in the Indianapolis plant. He spent about a year in the shop, then returned to sales and went to Cleveland in 1919. He was 60 years old.

• **Arthur W. Glessner,** active president and founder of the Excelsior Steel Furnace Co., Chicago, died Sept. 10, aged 81 years. Mr. Glessner founded the company 61 years ago.

• **Andrew J. Faust,** assistant welding superintendent at the Harnischfeger Corp., Milwaukee, for the past 13 years, died Sept. 6 at his home in Milwaukee. He was 46 years of age.

• **William Hackendahl,** president of Hackendahl & Schmidt Co., Milwaukee, for 35 years, died at his home in Milwaukee, aged 72 years. He left the Skobis Steel Co., Milwaukee, to organize the structural steel company of which he was the head, in 1905.

• **Edward J. Leiser,** superintendent of the Milwaukee works of the International Harvester Co., for eleven years before his retirement last year, died Sept. 2, aged 59 years. He began his work with the firm as a clerk in the job engine department office in 1905 and advanced steadily until he was made assistant superintendent in 1919, and in 1929 was appointed superintendent.

• **John Goetz,** president of the Goetz-Voss Corp., stokers and machine tools, died at his home in Milwaukee Sept. 2 aged 65 years. He was vice-president and general manager of the Kempsmith Mfg. Co., Milwaukee, until 1929 when he founded his own firm.

• **Edward W. P. Smith,** engineering consultant at the Lincoln Electric Co., and nationally known authority on arc welding, died suddenly aboard a train from Indianapolis to Cleveland. He was 56 years old. A veteran of more than 20 years' service with Lincoln, Mr. Smith spent the past year chiefly in the interests of the war production program, visiting war industry centers and instructing in the use of welding. He was affiliated with many of the nation's metallurgical technical societies and was co-author with A. F. Davis, vice-president and secretary of Lincoln Electric Co., of the Procedure Handbook of Arc Welding Design and Practice, a standard reference guide in the arc welding field.

NON-FERROUS METALS

. . . MARKET ACTIVITIES AND PRICE TRENDS

Tin Recovered from Cans Is 99.9% Pure

• • • **Tin recovered** from salvaged cans is reported by two large detinning companies to be 99.9 per cent chemically and metallurgically pure, in some instances as high as 99.99 per cent, entirely suitable for any industrial use including the major one of tin plate making. At present, detinning plants are still running principally on clippings, but the proportion of cans treated is increasing, helped by substantial shipments of Army cans, soon to be supplemented by shipments from Navy posts here and abroad. The Vulcan Detinning Co. reports that use of cans has not lowered its scrap iron output, but has somewhat lowered its output of recovered tin.

Vulcan is now purchasing cans from practically every state east of the Mississippi and expects shortly to receive shipments from as far west as Texas. This is possible only if cans are prepared in accordance with WPB specifications.

One of the principal disadvantages of unprepared (unsquashed) cans is the added transportation cost due to bulk. New York City is able to salvage unprepared cans, it was pointed out, only because the cans can be shipped by barge, at low cost, directly from the city to Metal & Thermit Corp.'s Carteret, N. J., plant. Metal & Thermit reports that since Mayor LaGuardia announced the can segregation ordnance, Sept. 6, collections have risen sharply. Last week they amounted to 468 tons, a 70 per cent increase over the 275 of the week before.

The copper supply available to U. S. consumers each month is about 180,000 tons, Harry O. King, chief of WPB's Copper Branch, has announced. Of this quantity, 100,000 tons are domestic production, 50,000 tons are imports and 30,000 tons are derived from scrap. Absolutely essential war needs are taking 98½ per cent of the supply. In May, when the last public report on production was made, 95,000 tons were being produced from domestic copper ores and about 6000 from scrap.

Mr. King said that we need almost twice our present copper supply to meet the requirements of the war effort. Of lead, he said that as our small arms output is increased and other metal shortages become still more acute, there is going to be an increasing demand for lead. "We are going to need every pound of metal we can get our hands on," he said. This expectation in WPB circles of a growing materiel need for lead is likely the reason WPB is slow to loosen lead restrictions.

A new method for recovering copper from plated iron and steel scrap has been announced by the electroplating division of E. I. du Pont de Nemours & Co. Virtually 100 per cent of the copper is said to be recovered in a form satisfactory for direct use in electroplating important metal parts for military equipment.

Formerly, copper plate was removed by stripping, a process that was costly and wasted most of the copper. The new deplating process is said to be carried out rapidly under controlled operating conditions without attack of the base metal, which also is retrieved for scrap.

Du Pont has also devised chemical methods for lifting copper, zinc, lead, nickel, tungsten, chromium and other strategic metals from low grade ore deposits. Flotation agents have been used in similar processes for many years, but new chemicals are said to have made froth flotation economically and practically feasible where it was not before.

A new copper sulphide ore flotation plant, of 12,000 ton capacity, is to be built in Chile by the Chile Exploration Co., according to the London *Metal Bulletin*. A similar plant, with 10,000-ton capacity, is to be built for the Greene Cananea Copper Co. in Mexico. The Chilean flotation plant will be a new departure for the Chuquicamata mine there, the world's largest, which has heretofore treated only oxidized ores lying close to the surface, crushing and leaching them, then refining them electrolytically or in furnaces.

Production of copper bars in Chile in 1941 was 435,527 metric tons, almost 30 per cent more than 1940's total of 337,700 tons.

All "free" silver held by the United States Treasury either has been lent to war industry or commitments have been made for its use, A. I. Henderson, deputy director general for operations, has announced.

Current demands for essential use now absorbs all silver imported into the United States and the demand is growing. By early next year it is expected to absorb also all newly-mined domestic silver. Some 5,000,000 ounces of silver, all that the Treasury can legally release, is being made available for use in essential war and if the war is prolonged additional Treasury silver will be made available.

The bulk of the approximate 1,350,000,000 ounces of silver now held by the Treasury over its reserve requirements has been earmarked, or is in use, for bus bars and other non-consumptive uses.

Use of tin for cans being cut sharply, see page 128.

The largest present essential consumptive uses of silver are as brazing alloys and as a substitute for tin in solder and in airplane engine bearings. The bulk of this demand now is being met by imports.

Paul V. McNutt's employment stabilization plan for lumbering and mining in 12 western states, affects mines producing the following non-ferrous ores: alunite and bauxite, antimony, beryllium, chrome, cobalt, columbium, copper, lead, magnesium, manganese, mercury, molybdenum, tantalum, tin, titanium, tungsten, uranium, vanadium, zinc and zirconium.

WPB's compliance branch is surveying operations of the 280-odd principal manufacturing users of tin, to determine their degree of compliance with WPB conservation orders. The companies to be checked use approximately 90 per cent of all tin consumed in this country.

An agency for recovery of zinc, similar to the Copper Recovery Corp., is said to be considered by industry and government.

MACHINE TOOLS

. . . SALES, INQUIRIES AND MARKET NEWS

Tool Demands Continue Heavy; Grinder Needs Up

Cleveland

• • • **The steady** heavy demand for machine tools of all types continues without any let-up, according to informed observers in this area. A change in the normal order of demand for machine tools was witnessed this week, with unusually heavy requirements for all types of grinders, such as plain, cylindrical, and rotary equipment, taking the lead, and milling machine equipment coming second. Normally, heaviest demand is for lathes, with milling machines second. It is suspected that the change in the order this week is due to one or two very large war orders sub-contracted to companies with little grinder capacity.

•

Licensing of Dealers in Used Machine Tools Set

• • • **Automatic licensing** of all dealers selling used machine tools or extras, or second-hand machines or parts, was announced Sept. 21 by OPA.

Supplementary Order No. 20, effective Sept. 26, also requires every second-hand machine tool or second-hand machinery dealer to register with OPA on or before Nov. 2, by filling out OPA Form No. SO20:3. This form is obtainable at the Washington office of OPA or at any OPA regional State or district office.

A dealer's license may be suspended if he violates any provision of Supplementary Order No. 20 or any price schedule or regulation covering such machine tools and machinery. The dealer thereupon loses his privilege to do business.

Maximum price for second-hand machine tools or extras are established in Revised Price Schedule No. 1 (Second-Hand Machine Tools). Those for machines and parts are provided in Maximum Price Regulation No. 136 as Amended (Machine and Parts and Machinery Services).

Ceiling prices for used machine tools range from 50 to 95 per cent of the prices of equivalent new machine tools, according to age and condition. For the used machines and parts covered by Maximum Price Regulation No. 136 as Amended, a maximum price of 85 per cent of the maximum price of the nearest equivalent new machine or part is permitted for a rebuilt and guaranteed machine, and 55 per cent if the machine is sold on an "as is" basis.

Supplementary Order No. 20 does not apply to retail sales of second-hand machine tools or extras, or second-hand machines or parts.

•

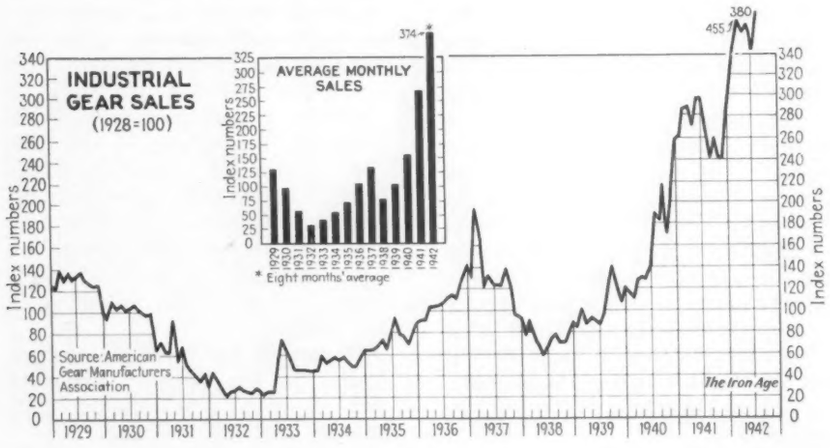
Demand Still Exceeds Production at Cincinnati

Cincinnati

• • • **Despite** some cancellation in orders, machine tool interests in the area indicate that the steady flow of orders tends merely to add to present backlog with the resultant indication that production is still not equal to present demand. While definite figures are not available at this time, operations on all machine tool plants in this area are well ahead of last year's record breaking total, with the possibility that the remainder of the year will follow the same production pattern. Of course, further expansion in production is expected when one or two plants still in the process of building, are completed and under way, but this will not be more than a moderate rise in present output. Warnings from Washington that more men are needed for the Army and that deferments on occupational basis will become more strict tend to keep personnel departments on their toes.

Industrial Gear Sales Rose in August

• • • Sales of industrial gears during the month of August rose 10.4 per cent over the July figure, according to the American Gear Manufacturers Association. The August figure is 38 per cent above the corresponding month of 1941. For the eight months of 1942 sales were 33.1 per cent higher than they were in the same period last year.



First of 16 Ore Boats Launched at Ecorse, Mich.

• • • **The first of a** fleet of 16 lake freighters of like size and design built by the U. S. Maritime Commission was launched this week at the Ecorse, Mich., yards of the Great Lakes Engineering Works. This new ore carrier, the S. S. Adirondack, has an over-all length of 620 ft., and a listed cargo carrying capacity of 15,500 tons.

Ten of these ships will be built by Great Lakes Engineering Works, five more at the Ecorse yards and four at the Ashtabula yards of the company. American Shipbuilding Co. will build the remaining six, four at its Lorain yards and two at Cleveland.

SCRAP

. . . MARKET ACTIVITIES AND QUOTATION TRENDS

Winter Outlook On Scrap Improves

• • • **Spurred by** official warnings that steel production will falter next winter unless more scrap is found, collection programs in many parts of the nation were being intensified this week. Newspapers and organizations were conducting a vigorous drive and getting encouraging results but the lack of trucks for the actual collection of scrap was proving an obstacle. The government promised gasoline and rubber for trucks collecting scrap.

A government announcement issued Monday asserted that the rise in scrap receipts by consumer plants indicated an increase in actual collections "accomplished during a period when normal sources of scrap have been lost or greatly diminished." Bearing out the latter thought was a reliable estimate from Detroit (see "Assembly Line" in this issue) to the effect that auto plants now engaged in war work are producing 25 per cent less scrap than during peace time. Another recent estimate places the actual effect of the use of low grade scrap today on open hearth production at between 2 and 3 per cent. When using poor scrap furnace output is off 2 to 3 per cent. In some cases, however, the loss has been even greater. Lend-lease shipments are still taking much scrap out of the nation.

All sorts of ideas for obtaining more scrap are coming out now, led by Westbrook Pegler's idea for the scrapping of all automobile bumpers.

Altogether, due to the combined efforts of voluntary campaigns and the efforts by War Materials, Inc., the chances of mills coming through the winter in good shape are much brighter. However, the nation probably will not be able to make full use of its enlarged steel capacity unless much larger quantities of scrap are found.

Scrap collectors are still leaving the business for higher paid jobs elsewhere. Yard help is being drafted, also. A new kind of trouble occurred for an eastern dealer this week. He had his permit to conduct business revoked because he declined to erect a fence around his property. The Army threatened to take over his business.

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WMI Will Foster Slag Dump Recovery

Pittsburgh

• • • **War Materials, Inc.,** will soon embark upon a program to expedite the working of slag dumps. A separate department is in the making at WMI which will act as clearing house for all information pertaining to the various methods of recovering scrap from dumps. It is hoped that engineers and operators in this country who have had actual experience in magnetic separation or any other type of slag dump recoverey methods will help pool this information with WMI so that the greatest amount of scrap can be recovered in the shortest space of time.

Several companies now are recovering their metallics almost as soon as they are dumped. But there are other open hearth steel dumps not being mined as efficiently as they could be if additional information on methods were available to the contractors. For instance, some companies holding contracts are concentrating on large pieces of metallics and overlooking such items as small shot or spillings, which it is said, comprise a substantial portion of recoverable material. Many interested sources are eyeing the Heckett and other programs, where considerable dump material is being recovered by magnetic separation.

G. M. plants uncover huge piles of scrap, former junkie finds pay in shipyard more attractive, see page 127.

The drive to concentrate on acceptable and more economical methods toward recovering dump material is going to be pushed because of the belief in some quarters that many good bets are being overlooked. Dumps are divided pretty much into three classifications: 1. Open-hearth dumps which are located at steel mills or close by on railroad dumps, all of which are being worked energetically today but some of which would yield more material under different methods of recovery; 2. Grey iron foundry dumps where some material could be recovered but where the difficulty exists because of the great number scattered throughout the country; 3. Blast furnace dumps which are probably the least lucrative in the group; 4. Commingled blast furnace and open hearth dumps and 5. R.R. dumps consisting of various metallics.

One drawback toward more technical or mechanical recovery of various dumps is the unavailability of machinery and equipment but it is suggested that after a short time the sifting of available information will undoubtedly result in a more balanced program for recovering scrap because of the pooling of the best experience to date.

One important source of scrap which is to be explored is co-called "pit refuse scrap." This consists of metal which has clung to bricks and other materials which fall into the pit or which represent the remains after furnaces have been relined or repaired. Some sources insist that the so-called pit refuse scrap would yield as much as 1 per cent of the total steel made, which if true would mean approximately 70,000 tons in a month. This phase will be thoroughly investigated to determine whether these estimates are correct and whether this will be a good source for scrap collection.

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Shipments of Scrap By States Disclosed

Washington

• • • **The Conservation Division** recently released state-by-state figures on the shipment of iron and steel scrap to mills during July.

"The figures represent actual shipments to consuming mills," said Paul C. Cabot, deputy director of the division. "Therefore, they do not cover all scrap material collected during that month which has not yet been segregated and prepared by scrap dealers for

shipment. Obviously, they do not reflect the increase resulting from the iron and steel scrap campaign which got under way on July 20."

"July figures," continued Mr. Cabot, "indicate some slight improvement, insofar as consumer inventories show a gain of approximately 188,000 tons over those of June. However, this is not enough. The minimum amount of iron and steel scrap necessary to keep our steel production up to capacity and at the same time collect a stockpile to carry over the bad weather months, has been set at 17,000,000 tons, to be collected in the last six months of 1942. The goal requires a monthly average of 2,833,000 tons. July's total shipments amounted to only 2,400,000 tons, or about 15 per cent less than the monthly average required. This is particularly serious in view of the fact that July should be one of the best months for the movement of scrap material."

Each state is named in the order of its percentage of accomplishment. North Dakota led all states for July by shipping 26.7 per cent of its six months' quota. The list follows:

State	Quota (Net Tons)	July Shipments (Per cent)
North Dakota	34,000	26.7
New Jersey	492,000	22.8
Maine	51,000	22.4
Vermont	16,000	21.5
Rhode Island	68,000	20.6
Oregon	47,500	20.4
Idaho	14,000	19.6
Georgia	132,000	18.0
Tennessee	204,000	16.3
Alabama	238,000	16.2
California	482,000	16.1
Wisconsin	375,000	15.9
New Hampshire	15,500	15.8
Illinois	1,790,000	15.6
Virginia	238,000	15.6
Washington	85,000	15.5
South Carolina	66,000	15.3
Massachusetts	391,000	14.8
Ohio	2,175,000	14.7
South Dakota	23,000	14.5
Delaware	16,000	14.3
United States Total	17,000,000	14.2
West Virginia	157,000	13.9
New York	1,208,000	13.8
Wyoming	27,000	13.8
Montana	32,500	13.6
Pennsylvania	2,978,000	13.5
Connecticut	306,000	13.4
Michigan	1,101,000	13.3
Minnesota	476,000	13.3
Colorado	68,000	13.0
Utah	33,000	13.0
Maryland	173,000	12.9
Texas	685,000	12.8
Florida	68,000	12.7
Kentucky	306,000	12.5
Louisiana	110,000	12.4
Indiana	715,000	12.2
Kansas	256,000	12.2
Nevada	3,500	12.2
North Carolina	175,000	12.0
Nebraska	119,000	11.9
Iowa	245,000	11.7
Missouri	442,000	11.5
Arizona	8,000	11.0
Washington, D. C.	17,000	11.0
Mississippi	51,000	10.9
Arkansas	85,000	9.6
New Mexico	12,000	7.9
Oklahoma	190,000	7.2

Solomon Named Head Of Scrap Advisory Committee

Washington

• • • **Edward T. Solomon,** of Max Solomon & Co., Pittsburgh, on Tuesday of last week was elected chairman of the Industry Advisory Committee for Price Schedule No. 4 (Iron and Steel Scap) appointed last month by Price Administrator Leon Henderson.

Cleveland Committee Formed

Cleveland

• • • **A committee of** 60 executives has been appointed to move dormant scrap, according to J. C. Deibel, regional chief of the industrial salvage section.

W. L. Seelbach, secretary-treasurer of Forest City Foundries Co., is chairman of the group, which will contact executives in neighboring companies, emphasizing the need for scrapping everything that is not being used.

CLEVELAND — Labor is becoming scarcer daily, and is the cause of considerable concern. At Ashtabula much scrap is lying around, but there is insufficient yard help to move it. Turnings in the Cleveland area are freer, but there is a definite deficiency of the more acceptable grades, especially low phos material.

BUFFALO—No important change has been noted in the "fairly good" movement through dealers' yards here. Most yards were idle Monday in observance of Yom Kippur.

BIRMINGHAM—Although mills in the Birmingham area have yet to suffer from inability to obtain material, the flow still is below normal. Most of the scrap is going to Northern mills on allocations.

BOSTON—The flow of material to consumers, has improved and bids fair to increase in October when salvage drives probably will reach their peak. The trend of scrap dealers to go out of business, lack of labor at yards, scarcity of automobile tires and the pending use of truck restrictions check the flow of materials to some extent.

TORONTO—New salvage campaigns are being started in many parts of Canada. The Alberta Petroleum Association in western Canada, has completed plans to make available for the war effort 2500 tons, chiefly from the Turner Valley oil field. The cities of London and Oshawa in Ontario have given contracts to A. Cope & Sons Ltd., Hamilton, for removal of rails from their streets, the company to receive the 1000 tons of rails in payment. During the past couple of weeks some scrap has been exported from Canada into the United States, but imports into Canada have practically disappeared

PITTSBURGH—Allocations are keeping some plants from lowering their output and the tendency is to keep production at the highest level possible without regard to the dwindling of scrap piles. More and more companies are depending on day to day shipments and allocations to keep them going.

PHILADELPHIA—This week's report on the scrap supply here offers no change over last week unless a very slight drop-off might be noted. Most mills report a very slim supply not exceeding a three weeks' pile although one mill very mysteriously said they were well fixed. Another reports a cinder dump about to be exploited which may mean some help for them. The local salvage campaigns here are swinging into full force and some relief is expected from them next week and in following weeks. A telephone conversation revealed that the steel industry's own salvage campaign is being organized and a committee chairman, presumably for this area, will be chosen in the next few days.

CHICAGO—The flow of scrap to mills here over the past week has shown a slight improvement, but is still far from being sufficient to permit building inventories against the winter months. An indication of the severity of the scrap shortage here is illustrated by the fact that small lots of scrap have been shipped into this area recently from the West Coast. The newspaper drives are having a beneficial effect, not so much from the point of the amount of household scrap that is being collected as from the point of focusing attention on the shortage anew and spurring the scrapping of abandoned railroads, buildings, etc., which, together with farm scrap, now holds the greatest potentialities so far as large quantities of good scrap are concerned.

ST. LOUIS—Although receipts continue to show gains over a month ago, collections in the present drive are being delayed reaching the mills because of a shortage of hauling facilities. Thus mills are unable to pile up inventories although operations have not been curtailed due to a shortage of scrap. One large mill has consumed 6000 tons of its reserves since July until now it has only a 10-day supply. The OCD is arranging for trucks to move scrap here beginning Oct. 5.

IRON AND STEEL (OTHER THAN RAILROAD) SCRAP

(All Prices Are Per Gross Ton)

	BASIC OPEN HEARTH GRADES (No. 1 Heavy Melting; No. 1 Hydr. Compressed Black Sheets; No. 2 Heavy Melting; Dealers' No. 1 Bundles; Dealers' No. 2 Bundles; No. 1 Busheling)	BLAST FURNACE GRADES (Mixed Borings and Turnings; Shovelling Turnings; No. 2 Busheling; Cast Iron Borings)	ELECTRIC FURNACE, ACID OPEN HEARTH AND FOUNDRY GRADES									
			Low Phos.		Heavy Structural and Plate			Cut Auto. Steel Scrap				
	Machine Shop Turnings		Billet, Bloom, Forge Crops	Bar Crops, Punchings Plate Scrap and Cast Steel	3 ft. and Under	2 ft. and Under	1 ft. and Under	3 ft. and Under	2 ft. and Under	1 ft. and Under and Auto, Springs, and Crankshafts	Alloy free Low Phos. and Sulphur Turnings	Heavy Axle and Forge Turn. First Cut	Electric Furnace Bundles
Pittsburgh, Brackenridge, Butler, Monessen, Midland, Johnstown, Sharon, Canton, Steubenville, Warren, Youngstown, Weirton	$20.00	$16.00	$16.00	$25.00	$22.50	$21.00	$21.50	$22.00	$20.00	$20.50	$21.00	$18.00	$19.50	$21.00
Cleveland, Middletown, Cincinnati, Portsmouth	19.50	15.50	15.50	24.50	22.00	20.50	21.00	21.50	19.50	20.00	20.50	17.50	19.00	20.50
Chicago, Claymont, Coatesville, Conshohocken, Harrisburg, Phoenixville, Sparrows Pt.	18.75	14.75	14.75	23.75	21.25	19.75	20.25	20.75	18.75	19.25	19.75	16.75	18.25	19.75
Ashland, Ky.	19.50	15.50	15.50	24.50	22.00	20.50	21.00	21.50	19.50	20.00	20.50	17.50	19.00	20.50
Buffalo, N. Y.	19.25	15.25	15.25	24.25	21.75	20.25	20.75	21.25	19.25	19.75	20.25	17.25	18.75	20.25
Bethlehem, Pa.; Kokomo, Ind.	18.25	14.25	14.25	23.25	20.75	19.25	19.75	20.25	18.25	18.75	19.25	16.25	17.75	19.25
Duluth, Minn.	18.00	14.00	14.00	23.00	20.50	19.00	19.50	20.00	18.00	18.50	19.00	16.00	17.50	19.00
Detroit, Mich.	17.85	13.85	13.85	22.85	20.35	18.85	19.85	19.85	17.85	18.35	3.85	15.85	17.35	18.85
Toledo, Ohio	.....	13.85	13.85	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. Louis, Mo.	17.50	13.50	13.50	22.50	20.00	18.50	19.00	19.50	17.50	18.00	18.50	15.50	17.00	18.50
Atlanta, Ga.; Alabama City, Ala.; Birmingham, Los Angeles; Pittsburg, Cal.; San Francisco	17.00	13.00	13.00	22.00	19.50	18.00	18.50	19.00	17.00	17.50	18.00	15.00	16.50	18.00
Minnequa, Colo.	16.50	12.50	12.50	21.50	19.00	17.50	18.00	18.50	16.50	17.00	17.50	14.50	16.00	17.50
Seattle, Wash.	14.50	10.50	10.50	19.50	17.00	15.50	16.00	16.50	14.50	15.00	15.50	12.50	14.00	15.50

BUNDLES: Tin can bundles are $4 below dealers' No. 2 bundles; No. 3 bundles are $2 less than No. 1 heavy melting.

SWITCHING CHARGES: Deductions for shipping points within basing points (cents per gross ton) are: Pittsburgh, Brackenridge, 55c.; Midland, Johnstown, Sharon, Youngstown, Warren, Weirton, Cleveland, Toledo, Los Angeles, San Francisco, 42c.; Butler, Monessen, Canton, Steubenville, Cincinnati*, Portsmouth, Ashland, Coatesville, Harrisburg, Phoenixville, Bethlehem, Kokomo, Duluth, St. Louis, 28c.; Buffalo, Claymont, 36c.; Conshohocken, 11c.; Atlanta, Birmingham, 32c.; Pittsburg, Cal., 42c.; Middletown, 14c.; Sparrow's Point, 11c.; Chicago, 84c.; Detroit, 53c.; Alabama City, 26c.; Minnequa, 22c.; Seattle, 38c.. *At Cincinnati, for basic open hearth grades, cut auto scrap and auto springs and crankshafts, deduct 80c. per ton.

PITTSBURGH basing point includes switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport. Cincinnati basing point includes Newport, Ky., switching district. St. Louis includes switching districts of Granite City, East St. Louis, Madison, Ill. San Francisco includes switching districts of S. San Francisco, Niles and Oakland, Cal.

MAXIMUM prices of inferior grades shall continue to bear same differential below corresponding grades as existed during the period Sept. 1, 1940, to Jan. 31, 1941. Superior grades cannot be sold at a premium without approval of OPA. Special preparation charges in excess of the above prices are banned. Whenever any electric furnace or foundry grades are purchased for open hearth or blast furnace use, prices may not exceed the prices above for the corresponding open hearth grades.

MAXIMUM SHIPPING POINT PRICE—Where shipment is by rail or vessel, or by combination of rail and vessel, the scrap is at its shipping point when placed f.o.b. railroad car or f.a.s. vessel. In such cases, the maximum shipping point prices shall be: (a) For shipping points located within a basing point, the price listed in the table above for the scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point and (b) for shipping points located outside the basing point, the price in table above at the most favorable basing point minus the lowest transportation charge by rail or water or combination thereof. Dock charge is 75c. a ton*, but 50c. if moved by deck scow or railroad lighter. Shipping by motor vehicle: The scrap is at its shipping point when loaded. For shipping points located within basing points take price listed in table minus applicable switching charge. If located outside a basing point, the price at the most favorable basing point minus lowest established charge for transporting by common carrier. If no established transportation rate exists, the customary costs are deducted. Published dock charges prevail. If unpublished include 75c.* For exceptions see official order.

AT NEW YORK city or Brooklyn, the maximum shipping point price is $15.33 for No. 1 heavy melting, f.o.b. cars, f.a.s. vessel or loaded on truck. Other grades carry differentials similar to those in table. New Jersey prices must be computed on basis of all-rail. At Boston the maximum is $15.05 for No. 1 f.o.b. cars, f.a.s. vessel or loaded on trucks. Shipments from a New England shipping point to a consumer outside New England carry maximum transportation charge of $6.65 per ton.

UNPREPARED SCRAP: For unprepared scrap, maximum prices shall be $2.50 (and in the case of the material from which No. 1, No. 2, and No. 3 bundles are made $4) less the maximum prices for the corresponding grade or grades of prepared scrap. In no case, however, shall electric furnace and foundry grades be used as the "corresponding grade or grades of prepared scrap." Converter may charge $2.50 per ton on consumer-owned unprepared remote scrap (see order).

Maximum price of all scrap in a vehicle is that of the lowest price grade in the shipment. This limitation does not apply to vessel shipments if grades are segregated.

Where scrap is to undergo preparation prior to its arrival at the point of delivery, such scrap is not at its shipping point, as that phrase is defined above, until after preparation has been completed.

CHEMICAL BORINGS: No. 1 (new, clean, containing not more than 1 per cent oil), $1 less than No. 1 heavy melting; No. 2 (new, clean, containing not more than 1.5 per cent oil), $2 less than No. 1 heavy melting. If loaded in box cars add 75c.

UNPREPARED CAST IRON SCRAP—Except for heavy breakable cast, unprepared scrap is given a price ceiling of $2.50 per ton less than the maximum prices for the corresponding grade of prepared cast iron scrap. Where scrap is to undergo preparation prior to arrival at the point of delivery, such scrap is not considered at shipping point until preparation is completed.

Consumers of cast scrap may pay the shipping point price plus established charge for transporting the scrap to their plants. In the case of deliveries by truck, the cast scrap buyer must obtain from the seller a certification, made out to OPA.

*At Memphis 50c.; Great Lakes ports $1; New England $1.25.

RAILROAD SCRAP

	No. 1 RR Heavy Melting	Scrap Rails	Rails for Rerolling	Scrap Rails 3 ft. and Under	Scrap Rails 2 ft. and Under	Scrap Rails 18 in. and Under
Cleveland, Cincinnati, Ashland, Portsmouth, Middletown	$20.50	$21.50	$23.00	$23.50	$23.75	$24.00
Canton, Pittsburgh, Sharon, Steubenville, Wheeling, Youngstown	21.00	22.00	23.50	24.00	24.25	24.50
Chicago, Philadelphia, Sparrows Pt., Wilmington, Birmingham, Los Angeles, San Francisco	19.75	20.75	22.25	22.75	23.00	23.25
Buffalo	18.00	19.00	20.50	21.00	21.25	21.50
Detroit	20.25	21.25	22.75	23.25	23.50	23.75
Duluth	18.85	19.85	21.35	21.85	22.10	22.35
Kansas City, Mo.	19.00	20.00	21.50	22.00	22.25	22.50
Kokomo, Ind.	17.00	18.00	19.50	20.00	20.25	20.50
Seattle	19.25	20.25	21.75	22.25	22.50	22.75
St. Louis	13.50	16.50	18.00	18.50	18.75	19.00
	18.50	19.50	21.00	21.50	21.75	22.00

CAST IRON SCRAP

	Group A	Group B	Group C
No. 1 cupola cast	$18.00	$19.00	$20.00
No. 1 machinery cast, drop broken, 150 lbs. and under	18.00	19.00	20.00
Clean auto cast	18.00	19.00	20.00
Unstripped motor blocks	17.50	18.50	19.50
Stove Plate	17.00	18.00	19.00
Heavy Breakable Cast	16.50	16.50	17.50
Charging box size cast	17.00	18.00	19.00
Misc. Malleable	20.00	21.00	22.00

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.
Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas Oklahoma, Texas and Florida.
Group C: States not named in A and B; switch district of Kansas City, Kan., Mo.

Smaller Plants Division Inaugurated in WPB by Nelson

Washington

• • • **To provide machinery** for the spread of war work to the smaller manufacturing plants of the country, WPB Chairman Donald M. Nelson has set up in WPB a Smaller War Plants Division, formally placing his deputy chairman of Smaller War Plants, Lou E. Holland, at its head. Mr. Holland, who had already been appointed chairman of the Smaller War Plants Corp. created by the Murray-Patman Act, last Saturday made a statement showing how the new division is to function.

Each WPB regional office, assistant regional director, will be a SWP Division representative. In the 127 field offices, practical engineers with long machine shop and production experience will assist small business in participating in war work. All WPB facilities records in Washington will be fitted together with reports from field representatives, in an effort to find facilities suitable for the execution of all or certain parts of war orders.

Field representatives will solicit subcontracts, guide subcontractors in the application for and execution of contracts and through the grouping of facilities, make it possible for small manufacturers to obtain prime contracts.

In summarizing Mr. Holland said:

"We are going to see to it that every small manufacturer who gets a war contract, either prime or sub, executes that contract to the satisfaction of the buyer. In this way the small fellow will put himself in line for further contracts, and prime contractors who have been reluctant to do more subcontraction will become more inclined to do so."

This is the first "critical area" to be established in the country. It includes the states of Arizona, Colorado, Idaho, Montana, Utah, Wyoming, California, Nevada, Oregon, Washington, New Mexico and Texas.

Chairman McNutt set up an employment stabilization plan to halt wasteful pirating and migration of workers engaged in the production of these essential materials in the area.

Removing Drills With Arc Welding Technique

(CONCLUDED FROM PAGE 60)

erator to seek means of removing the broken tool himself. The usual crude method employed by an operator is trying to drive it out, or break it out piece by piece, with a prick punch and hammer. Experience shows that this method is seldom successful and usually results in burred surfaces (see Fig. 8) and other forms of distortion which directly cause scrap or which tend to defeat the purpose of the arc welding method of removal.

Also the use of a prick punch and hammer frequently results in broken punch points being tightly lodged in the hole above the broken drill, or jammed in between the flutes and the drilled hole, thereby making the removal operation more difficult, or impossible.

Fig. 5 shows an 11/32 in. drill extracted from the hole in the bolting flange of the engine part. Due to protecting the finished surfaces with Spatter-off as shown in the area of the drilled hole, no damage was done to the part, which was immediately returned to the production lines. Under the old method of burning with electricity and compressed air, the complete removal of this broken drill would have required several hours of labor, including the repair of hole after removal in this way. With the new method of welding, the time of removal was only a few minutes and the drilled hole did not require plugging and re-machining or any other form of repair.

Fig. 6 illustrates an extracted pilot which had been broken in the drilled hole in a cylinder pad. The same removal technique was used to extract this pilot as was used in removing the broken drill from the engine part shown in Figs. 2 to 5. Note that Spatter-off again protected the finished surfaces in and around the drilled hole.

In Fig. 1, the entire layout of apparatus to do this job is shown. Note the Flex Arc welder at the right has plug-in positions to make available various current ratings from 20 to 250 amp. to suit the requirements of any job using welding rod from 3/32 to ¼ in. in diameter. So far, 3/16 in. diameter stainless steel welding rod has been found sufficient in tensile strength to do the toughest job at Pratt & Whitney Aircraft. This was the extraction of a 4 in long, ⅞ in. reamer having eight flutes.

Range of Work

The smallest broken tool removed by this method was a 0.040 in. drill in the bottom of a 5/16 in. hole 3 in. deep in an engine crankcase section. A previous method of removal would have been to trepan around the broken drill and insert a plug of the same material. This would then have necessitated the redrilling of the 0.040 in. oil hole in the production line. The time required for trepanning, plugging, re-locating in the fixture and re-operating would have required several hours of labor. But by the new welding method actually used, a 3/32 in. welding rod was ground down to a sharp point at the contact end and covered with an insulating coat of glycerothalate in the ground-down area. The current rating of the welder was reduced to 30 amp., the welding rod was inserted in the 3 in. deep hole, and centered on the 0.040 in. drill. The result was a butt-weld of sufficient strength to permit the extracting of the broken drill. The crankcase section immediately went back into production.

Instances of this kind are now being repeated daily, and with greater savings of time as the operator becomes more proficient in the art of using this equipment. The scope of the work has now increased to include the effective salvaging of all sections of engine crankcases, crankshafts, propeller shafts, cages, various small parts, tools, jigs and fixtures which are made useless by a broken drill, reamer, pilot or plug gage.

Fig. 7 shows a variety of drills, reamers and plugs removed from engine parts and machine tool fixtures. Fig. 8 shows the result of trying to remove a broken drill with punch and hammer.

Fuel & Iron Earnings Up

• • • **Colorado** Fuel & Iron Corp. reports net income of $2,580,135, equivalent to $4.58 a share, in the fiscal year ended June 30, 1942. Net income in the previous fiscal year was $2,288,318, or $4.06 a common share.

G.M. Plants Uncover Huge Piles of Scrap

Detroit

• • • **An intensive scrap drive** in 90 General Motors war plants has increased the nation's stockpile by a total of 531,000,000 lb. of iron, steel, copper, aluminum and other metals essential to the war effort, B. D. Kunkle, vice-president in charge of manufacturing, reported Sept. 19.

Enough old metal to provide the scrap necessary to build two 35,000-ton battleships has been turned up in plant "attics" by General Motors "waste wardens" since Jan. 1, Mr. Kunkle disclosed. This is in addition to the normal flow of production scrap from metal finishing machines. In the month of July alone more than 16,700,000 lb. of "non-production" scrap was brought to light.

In one plant a "mine" was discovered alongside a railroad siding where cast iron borings had been dumped for years prior to shipping. An electro-magnet has been rigged to a truck in still another plant, and regular forays for loose metal are made up and down the yard.

Several plants have shipped along to mill and smelter the tons of railway rails which formerly served as parking lot bumpers. Salvage committees have been organized by all General Motors divisions.

In the first seven months of 1942 scrap shipments of all types from GM plants totaled 500,000,000 lb. of iron and steel and 31,000,000 lb. of non-ferrous metals, according to the Kunkle report. Complete figures for non-production scrap were available only for June and July when 25,118,653 lb. of iron and steel and 574,023 pounds of non-ferrous metals were "discovered." In the period from Jan. 1 to June 1 incomplete reports from 24 divisions revealed that 44,575,828 lb. of non-production iron and steel and 744,909 lb. of other metals were shipped.

Meanwhile, the automobile divisions of General Motors have been analyzing all automobile dies to determine whether they need be held for manufacture of essential replacement parts. Following such a study one division shipped out 319,830 lb. of dies in a single lot. Two weeks later another shipment of 144,090 lb. was made. Another division scrapped 955,000 lb. of dies in July alone.

One scrap committee chairman reported that "dormant metal has been ferreted out from beneath benches, in cupboards and desks, hanging on the walls and in out-of-the-way places in buildings and in the yards." One large cupboard was found to contain five shelves piled high with metal. When this cache was boiled down to essential pieces, only one shelf remained.

Looking through its tool "morgue," one plant discovered 1800 tools that had not been called for in the past five years.

Here are excerpts from the report of the salvage department head in another General Motors plant:

"Nickel carburizing pots and boxes: This material was being stored in our heat treat building and under ordinary conditions would have been traded in on new material. The management decided that due to the scarcity of nickel this should be scrapped and put into use at once.

"Structural steel scrap: Material made available by scrapping of unnecessary framework and equipment throughout the plant.

"A general work order has been issued for the removing of the screw conveyor, floor plates and channel iron from the old sand blast system in our heat treat department.

"A general work order has been issued for the cleaning up of miscellaneous items in the basement of our heat treat building such as turntables, steel rails, wire screening, etc.

"We have instructed our foundry to scrap approximately 50,000 pounds of steel flasks and to re-check this storage for additional scrap."

In addition to intensive efforts to collect scrap General Motors divisions also are doing everything in their power to reclaim and salvage old material to cut down on re-orders.

Worn punches are re-worked to smaller sizes; tools are also made over; dies are re-cut and ground; the same grade and grain of wheel is used on a number of grinding operations so that the stubs of large wheels can be redressed for use as small wheels when this is consistent with good operation. Towels, wiping cloths and even waste is now laundered, while leather and cotton gloves are dry-cleaned. Those that have served their purpose for one use are separated, sterilized and used again in another way. This process is continued until their lubricating value is exhausted. And even that isn't the end, because, if the waste material is suitable, it is finally emptied into the fuel oil tanks and burned as fuel.

One machine gun plant found its grinder sludge contained 95 per cent ferrous metal and obtained permission from the steel mill to ship the sludge with the other scrap. It developed a method of recovering steel, lead and copper alloy from the sand used to stop bullets on the proof firing range and recovered 20,000 pounds of material in the initial operation. It also developed a system for reclaiming and reusing such strategic materials as petroleum benzine. In the case of material that is still usable, such as conveyors, truck wheels, structural steel, etc., outside firms are asked if they can use such items, before they are classed as scrap.

Another vital phase of the General Motors scrap program involves the segregation of materials so that an alloy of one type is not contaminated by pieces of metal composed of an alloy of another.

One GM division placed a number of containers in each department, each container being painted a different color and marked for a certain type of scrap. Its efforts also include an educational campaign among the workers. Another division is even segregating sludge so that it can recover the 50 per cent pure chromium contained in the grindings from chrome plated steel tubing.

Former Junkie Finds Pay In Shipyard More Attractive

Chicago

• • • **The plight** of the small junk dealer in attempting to operate under present OPA scrap price ceilings is vividly described in a recent letter published in the *Chicago Tribune*. The letter follows:

Morris, Ill., Sept. 11—I have been in the junk and wrecking business for the last 15 years, but had to quit last spring after the government put a ceiling price on scrap.

Now what can you pay for iron, after you spend $1,200 for a truck, $75 for a cutting torch, pay a man $6 a day, pay for state and city licenses, and pay $2 a ton for your oxygen and acetylene to cut up the iron. It takes one day to prepare five tons of iron for the market and another day to deliver it 70 miles to market.

Everybody knows what you get for iron but they do not understand how much work and what the cost will be to market this iron. I cannot pay the price for the tons and tons of iron that are around here.

So now I am working at the Seneca shipyards making $75 a week and I wonder why I worked so hard for so little pay in the junk business.

RALPH H. JONES.

Use of Tin for Cans Being Cut Sharply

• • • **Demand for** tin for domestic cans, over 21,000 long tons, this year, will be cut almost in half in 1943 by the use of electrolytic tin plate and bonderized black plate in place of hot dipped tin plate.

Peace-time practice was to make cans from hot dipped tin plate having 1.5 lb. of tin per base box of about 100 pounds. Under pressure of war-time conservation, hot dipped plate was reduced to 1.25 lb. of tin per base box where such plate is applicable. Realizing that this reduction was only a drop in the bucket in a situation where 90 per cent of our tin supply had been cut off, WPB early in the war pushed production of electrolytic plate, which can be made with as little tin as 0.1 lb. per base box. Experiments showed that a tin deposit of 0.5 lb. per base box was, however, more practical for most purposes.

A second important means of getting cans, and at the same time reducing the amount of tin required, is bonderized black plate. This is a process of treating the surface of the steel to make certain lacquers adhere to it firmly enough to prevent corrosion by the substance packed.

Substitution of electrolytic tin plate and bonderized steel ends for cans, wherever the nature of the pack permits, is estimated to save 3,500 tons of tin plate per year by 1943. Substitution of electrolytic tin plate bodies and bonderized steel ends wherever practical will save an additional 4,300 tons of tin, a total of 7,800 tons per year. Use of electrolytic tin plate and bonderized steel for both bodies and ends wherever possible, will make an additional saving of 3,300 tons. The total esimated to be saved by this program per year by 1943 is thus about 10,000 tons, WPB says.

An interesting problem develops in connection with the latter step, which may alter the program somewhat. The primary objective is to save tin. Tin is needed for coating the steel, and for solder to seal the joints. A balance of these two needs must be achieved to get maximum savings. In the all-bonderized can, a tin-lead solder must be used, whereas in a combination electrolytic-plate-bonderized can, silver-lead solder can be used. The saving of tin in solder in the latter case may easily amount to more than the saving of tin from decreased use of electrolytic plate, WPB says.

Production of electrolytic tin plate involves deep-seated changes in tin plate production. Some estimates place the expenditures required at a cost of over 75 million dollars for more new electrolytic tin plate plants. Twenty-seven electrolytic tin units are currently under construction and 18 bonderizing plants. Some are in the same plants as formed tin dip units. Unfortunately, conversion of tin dip plants to electrolysis is not possible.

Another obstacle, and one which is not yet solved completely, is the need to heat-treat the electrolytic plate after plating to develop a metallurgical bond—really an alloying of the tin and steel—between the plate and the tin coating. This is necessary to permit efficient soldering of the cans, and to provide a surface which will take can enamels satisfactorily. Experiments are now being conducted on this phase of the problem.

The broad tin conservation program includes substitution of other materials for tin wherever possible. Inasmuch as some products must be packed in the heavy hot dipped tin plate cans (1.5 lb. of tin per base box), efforts are now being made to pack as much of this type of product in glass and other non-tin containers as possible.

U. S. Steel Shipments Again Set Record

• • • Shipments of finished steel products by subsidiary companies of the United States Steel Corp. for August, 1942, totaled 1,788,650 net tons.

The August shipments compare with 1,765,749 net tons in the preceding month (July) an increase of 22,901 net tons, and with 1,753,665 net tons in the corresponding month in 1941 (August) an increase of 34,985 net tons.

For the year 1942 to date, shipments were 14,057,906 net tons compared with 13,473,209 net tons in the comparable period of 1941, an increase of 584,697 net tons.

August shipments were the highest for that month in the history of the corporation. Shipments for the year to date are the highest for any like period and compare with 12,187,424 tons in the first 8-months of 1929.

Milling Machine Practice Subject of New Bulletin

Cincinnati

• • • **Fundamental principles of** milling operations are discussed in a revised bulletin on "Milling Machine Practice," just published by the Cincinnati Milling Machine Co. The material has been reprinted from Kent's Mechanical Engineers Handbook and was prepared by Dr. Hans Ernst, research director, and Mario Martellotti, research engineer.

The bulletin begins with a mathematical analysis of the process of milling and after classifying the various types of milling cutters, considers the controlling factors in connection with their use such as cutting speed, feed rate, clearance and relief angles, use of cutting fluids, power required for milling and a discussion of the difference between up-milling and down-milling. This last named phase of the subject is analyzed in as objective a manner as is found in print today. The bulletin concludes with a chapter on the standard types of milling machines. Except for the photographs, all the material in the bulletin is non-proprietary in nature.

"Aircraft Riveting" Subject Of Textbook for Students

• • • **The first book of its kind** specifically devoted to "Aircraft Riveting" has been written by E. B. Lear, associate engineer, Monarch Aero Products, in collaboration with James E. Dillon of the Cleveland Pneumatic Tool Co. This small book is intended to be a text for students entering the aircraft production field and should serve as an instructional medium both in the school and in the shop.

After a brief introduction, the authors discuss the various types of rivets, rivet materials, the strength of riveted joints, the tools used to prepare rivet holes and the various types of pneumatic hammers and squeezers now used in the aircraft industry. Riveting methods are described and there is a chapter on "Dont's for Riveters." A list of shop terms relating to riveting is given. The book concludes with a chapter on personal tool requirements of the beginner.

This book is published by the Pitman Publishing Corp. of New York and Chicago.

. . . Composite Prices

Advances Over Past Week in **Heavy Type**; Declines in *Italics*. (Prices Are F.O.B. Major Basing Points)

Flat Rolled Steel: (Cents Per Lb.)	Sept. 22, 1942	Sept. 15, 1942	Aug. 25, 1942	Sept. 23, 1941
Hot rolled sheets	2.10	2.10	2.10	2.10
Cold rolled sheets	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50
Hot rolled strip	2.10	2.10	2.10	2.10
Cold rolled strip	2.80	2.80	2.80	2.80
Plates	2.10	2.10	2.10	2.10
Stain's c.r. strip (No. 302)	28.00	28.00	28.00	28.00
Tin and Terne Plate: (Dollars Per Base Box)				
Tin plate	$5.00	$5.00	$5.00	$5.00
Manufacturing ternes	4.30	4.30	4.30	4.30
Bars and Shapes: (Cents Per Lb.)				
Merchant bars	2.15	2.15	2.15	2.15
Cold finished bars	2.65	2.65	2.65	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10
Stainless bars (No. 302)	24.00	24.00	24.00	24.00
Wire and Wire Products: (Cents Per Lb.)				
Plain wire	2.60	2.60	2.60	2.60
Wire nails	2.55	2.55	2.55	2.55
Rails: (Dollars Per Gross Ton)				
Heavy rails	$40.00	$40.00	$40.00	$40.00
Light rails	40.00	40.00	40.00	40.00
Semi-Finished Steel: (Dollars Per Gross Ton)				
Rerolling billets	$34.00	$34.00	$34.00	$34.00
Sheet bars	34.00	34.00	34.00	34.00
Slabs	34.00	34.00	34.00	34.00
Forging billets	40.00	40.00	40.00	40.00
Alloy blooms, billets, slabs	54.00	54.00	54.00	54.00
Wire Rods and Skelp: (Cents Per Lb.)				
Wire rods	2.00	2.00	2.00	2.00
Skelp (grvd)	1.90	1.90	1.90	1.90

Pig Iron: (Per Gross Ton)	Sept. 22, 1942	Sept. 15, 1942	Aug. 25, 1942	Sept. 23, 1941
No. 2 fdy., Philadelphia	$25.89	$25.89	$25.89	$25.84
No. 2, Valley furnace	24.00	24.00	24.00	24.00
No. 2, Southern Cin'ti	24.68	24.68	24.68	24.06
No. 2, Birmingham	20.38	20.38	20.38	20.38
No. 2, foundry, Chicago†	24.00	24.00	24.00	24.00
Basic, del'd eastern Pa.	25.39	25.39	25.39	25.34
Basic, Valley furnace	23.50	23.50	23.50	23.50
Malleable, Chicago†	24.00	24.00	24.00	24.00
Malleable, Valley	24.00	24.00	24.00	24.00
L. S. charcoal, Chicago	31.34	31.34	31.34	31.34
Ferromanganese‡	135.00	135.00	135.00	120.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.
‡For carlots at seaboard.

Scrap: (Per Gross Ton)				
Heavy melting steel, P'gh.	$20.00	$20.00	$20.00	$20.00
Heavy melt'g steel, Phila.	18.75	18.75	18.75	18.75
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	18.75
No. 1 hy. comp. sheet, Det.	17.85	17.85	17.85	17.85
Low phos. plate, Youngs'n	22.50	22.50	22.50	23.00
No. 1 cast, Pittsburgh	20.00	20.00	20.00	22.00
No. 1 cast, Philadelphia	20.00	20.00	20.00	24.00
No. 1 cast, Ch'go	20.00	20.00	20.00	20.00
Coke, Connellsville: (Per Net Ton at Oven)				
Furnace coke, prompt	$6.00	$6.00	$6.00	$6.125
Foundry coke, prompt	6.875	6.875	6.875	6.875
Non-Ferrous Metals: (Cents per Lb. to Large Buyers)				
Copper, electro., Conn.	12.00	12.00	12.00	12.00
Copper, Lake, New York	12.00	12.00	12.00	12.00
Tin (Straits), New York	52.00	52.00	52.00	52.00
Zinc, East St. Louis	8.25	8.25	8.25	7.25
Lead, St. Louis	6.35	6.35	6.35	5.70
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	16.50

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 126 to 132 herein.

. . . Comparison of Prices

	FINISHED STEEL	PIG IRON	SCRAP STEEL
Sept. 22, 1942	2.30467c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One week ago	2.30467c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One month ago	2.30467c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One year ago	2.30467c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton

	HIGH	LOW	HIGH	LOW	HIGH	LOW
1942	2.30467c.,	2.30467c.,	$23.61	$23.61	$19.17	$19.17
1941	2.30467c.,	2.30467c.,	$23.61, Mar. 20	$23.45, Jan. 2	$22.00, Jan. 7	$19.17, Apr. 10
1940	2.30467c., Jan. 2	2.24107c., Apr. 16	23.45, Dec. 23	22.61, Jan. 2	21.83, Dec. 30	16.04, Apr. 9
1939	2.35367c., Jan. 3	2.26689c., May 16	22.61, Sept. 19	20.61, Sept. 12	22.50, Oct. 3	14.08, May 16
1938	2.58414c., Jan. 4	2.27207c., Oct. 18	23.25, June 21	19.61, July 6	15.00, Nov. 22	11.00, June 7
1937	2.58414c., Mar. 9	2.32263c., Jan. 4	23.25, Mar. 9	20.25, Feb. 16	21.92, Mar. 30	12.92, Nov. 10
1936	2.32263c., Dec. 28	2.05200c., Mar. 10	19.74, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
1935	2.07642c., Oct. 1	2.06492c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, Apr. 29
1934	2.15367c., Apr. 24	1.95757c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	1.95578c., Oct. 3	1.75836c., May 2	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.89196c., July 5	1.83901c., Mar. 1	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931	1.99629c., Jan. 13	1.86586c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.25488c., Jan. 7	1.97319c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.31773c., May 28	2.26498c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3

Weighted index based on steel bars, beams, tank plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 per cent of the United States output. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Prices of Finished Iron and Steel . . .

Steel prices shown here are f.o.b. basing points, in cents per lb., unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases freight absorbed to meet competition.

Basing Point → / Product ↓	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio	Gulf Ports, Cars	Pacific Ports, Cars[10]	DELIVERED TO Detroit	New York	Philadelphia
SHEETS															
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.22¢	2.35¢	2.28¢
Cold rolled[1]	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.17¢	3.41¢	3.39¢
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.75¢	3.68¢
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.47¢	3.73¢	3.69¢
Long ternes[2]	3.80¢		3.80¢									4.55¢		4.18¢	4.14¢
STRIP															
Hot rolled[3]	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.22¢	2.48¢	
Cold rolled[4]	2.80¢	2.90¢		2.80¢			2.80¢	(Worcester =3.00¢)					2.92¢	3.18¢	
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢							2.58¢	
Commodity C-R	2.95¢			2.95¢			2.95¢	(Worcester =3.35¢)					3.07¢	3.33¢	
TIN PLATE															
Standard cokes, base box	$5.00	$5.00	$5.00						$5.10					5.38¢	5.34¢
BLACK PLATE															
29 gage[5]	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢[13]			3.39¢
TERNES, M'FG.															
Special coated, base box	$4.30	$4.30	$4.30						$4.40						
BARS															
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		(Duluth =2.25¢)			2.52¢	2.80¢	2.27¢	2.51¢	2.49¢
Rail steel[6]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢					2.52¢	2.80¢[14]			
Reinforcing (billet)[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.52¢	2.55¢[14]	2.27¢	2.40¢	
Reinforcing (rail)[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.52¢	2.55¢	2.27¢		2.49¢
Cold finished[8]	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢			(Detroit =2.70¢)					3.01¢	2.99¢
Alloy, hot rolled	2.70¢	2.70¢				2.70¢		(Bethlehem, Massilon, Canton =2.70¢					2.82¢		
Alloy, cold drawn	3.35¢	3.35¢	3.35¢	3.35¢		3.35¢							3.47¢		
PLATES								(Coatesville and Claymont =2.10¢)							
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	2.25¢[11]		2.47¢	2.65¢	2.33¢	2.30¢	2.155¢
Wrought iron	3.80¢														
Floor plates	3.35¢	3.35¢									3.72¢	4.00¢		3.73¢	3.69¢
Alloy	3.50¢	3.50¢			(Coatesville =3.50¢)						3.97¢	4.15¢		3.71¢	3.60¢
SHAPES															
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢		(Bethlehem =2.10¢)			2.47¢	2.75¢		2.28¢	2.22¢
SPRING STEEL, C-R															
0.26 to 0.50 Carbon	2.80¢			2.80¢			(Worcester =3.00¢)								
0.51 to 0.75 Carbon	4.30¢			4.30¢			(Worcester =4.50¢)								
0.76 to 1.00 Carbon	6.15¢			6.15¢			(Worcester =6.35¢)								
1.01 to 1.25 Carbon	8.35¢			8.35¢			(Worcester =8.55¢)								
WIRE[9]															
Bright[15]	2.60¢	2.60¢		2.60¢	2.60¢		(Worcester =2.70¢)					3.10¢			2.94¢
Galvanized	add proper size extra and galvanized extra to bright wire base, above.														
Spring (High Carbon)	3.20¢	3.20¢		3.20¢			(Worcester =3.30¢)					3.70¢			3.54¢
PILING															
Steel sheet	2.40¢	2.40¢				2.40¢						2.95¢			2.74¢
IRON BARS[12]															
Wrought single refined	4.40¢														
Wrought double refined	5.40¢														

[1] Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base. [2] Unassorted 8-lb. coating. [3] Widths up to 12 in. [4] Carbon 0.25 per cent and less. [5] Applies to certain width and length limitations. [6] For merchant trade. [7] Prices for straight length material only, from a producer to a consumer. Functional discount of 25c. per 100 lb. to fabricators. [8] Also shafting. For quantities of 20,000 to 39,999 lb. [9] Carload lot to manufacturing trade. [10] These prices do not apply if the customary means of transportation (rail and water) are not used. [11] Ship plates only. [12] Common iron bars quoted at 2.15c. by Terre Haute, Ind. producer. [13] Boxed. [14] Portland and Seattle price, San Francisco price is 2.50c. [15] This bright wire base price to be used in figuring annealed and bright finish wires, commercial spring wire and galvanized wire.

GOVERNMENT CEILINGS—Price Schedule No. 6 issued April 16, 1941, governs steel mill prices; Price Schedule No. 49 governs warehouse prices, which are on another page of this issue.

EXCEPTIONS TO PRICE SCHEDULE NO. 6—On hot rolled carbon bars, Phoenix Iron Co. may quote 2.35c. at established basing points; Calumet Steel division of Borg Warner may quote 2.35c., Chicago, on bars from its 8-in. mill; Joslyn Mfg. Co. may quote 2.35c., Chicago base. On rail steel bars Sweets Steel Co. may quote 2.33c., f.o.b. mill. On hot rolled sheets, Andrews Steel Co. may quote for shipment to Detroit area on Middletown base. On galvanized sheets, Andrews Steel may quote 3.75c. at established basing points. On hot rolled strip, Joslyn Mfg. Co. may quote 2.30c., Chicago base. On plates, Granite City Steel Co. may quote 2.35c., f.o.b. mill, and Central Iron & Steel Co. may quote 2.20c., f.o.b. basing points. On shapes, Phoenix Iron Co. may quote 2.30c. established basing points and 2.50c. Phoenixville for export.

On rail steel merchant bars, Eckels-Nye Corp. may charge 2.40c. On tubing, South Chester Tube Co. may price Gulf or Pacific Coast all-rail shipments and shipments west of Harrisburg on basis of f.o.b. Chester. On lend-lease sales to eastern seaboard, Sheffield Steel Co. and Colorado Fuel & Iron Corp. may sell f.o.b. mill. SEMIFINISHED STEEL—Follansbee Steel Corp. may sell forging billets at $49.50 f.o.b. Toronto; Continental Steel Corp. may sell Acme Steel Co. at $34 for rerolling billets plus extras and freight; Ford Motor Co. may sell rerolling billets at $34 f.o.b. Dearborn; Andrews Steel Co. may sell forging billets at $50 at established basing points and slabs at $41; Empire Sheet and Tin Plate may sell slabs at $41 at established basing points and sheet bars at $39 f.o.b. mill. ALLOY STEEL BARS—Texas Steel Co. may use Chicago base f.o.b. Fort Worth.

SMALL DIE CASTINGS ALSO SERVE

Shank shown in inset approximately ½ actual size—4,100 castings to the pound.

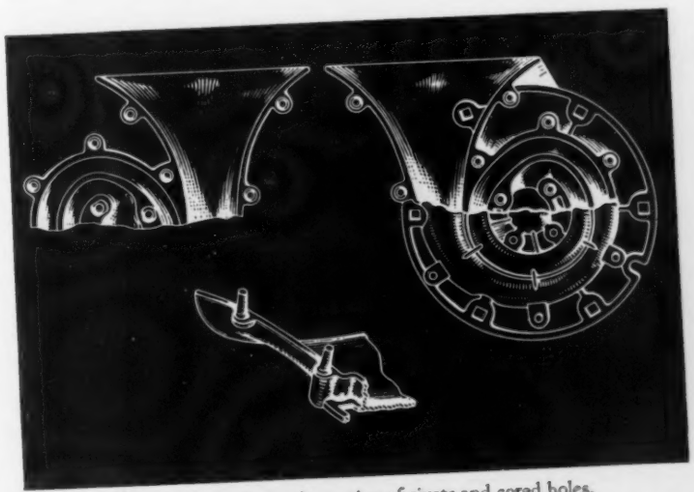
When the manufacturer of the tiny ZINC Alloy Die Castings shown above supplies one pound of his product to the Government, he is providing cup-eye shanks for 4,100 doctors' and nurses' uniform buttons. As shown in the inset, these die cast shanks are used in conjunction with toggle pins to form detachable button fasteners.

The die casting machine which produces these button shanks is one of a special design for turning out small parts at high speed. Such a machine is capable of production quantities as high as 320 castings per minute!

INTEGRALLY CAST RIVETS FACILITATE ASSEMBLY

One of the outstanding advantages of the die casting process is its ability to provide fastening elements as integral parts of a casting. These elements usually take the form of studs or rivets, either hollow or with hollow ends, and assembly is completed by merely riveting, staking or spinning over the ends. This makes it unnecessary to provide and to handle separate fastening elements, and effects considerable savings.

An interesting case in point is the assembly illustrated in the drawing below. Several integral studs on one ZINC Alloy Die Cast part mate with cored holes in another die casting. When the mating castings are put together, assembly is effected by simply heading over the ends of the rivets.



The cutaway shows the mating of rivets and cored holes.

THE New Jersey zinc° ALLOY POT

FOR VICTORY BUY UNITED STATES WAR SAVINGS BONDS STAMPS

A publication issued for many years by The New Jersey Zinc Company to report on trends and accomplishments in the field of die castings. Title Reg. U. S. Pat. Off.

IRON AGE EDITION

ZINC ALLOY DIE CASTINGS ARE TOUGH

The ability of ZINC Alloy Die Castings to "take it" is graphically illustrated by the die cast grease seals for the steering knuckle universal joints on Army "Jeeps." If a part stands up on a "Jeep" it will stand up almost anywhere.

Here is what the manufacturer of the "Jeep" axle assemblies has to say about the die cast grease seals: "This seal has proven highly satisfactory . . . . is sturdy enough to withstand abuse from flying stones and gravel and cannot be torn off by striking sticks, stumps, small trees and so forth."

The strength of ZINC Alloy Die Castings exceeds that of most other commonly cast materials. For specific technical data on strength and other properties we suggest that you read the bulletin "Zamak Alloys for Zinc Alloy Die Castings." Just ask us for a copy—on your company letterhead.

The die cast grease seals serve in a vulnerable spot.

THE NEW JERSEY ZINC COMPANY 160 FRONT ST., NEW YORK CITY

HORSE HEAD SPECIAL (99.99 + % Uniform Quality) ZINC

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (rerolling only). Prices delivered Detroit are $2.25 higher; f.o.b. Duluth, billets only, $2 higher.

	Per Gross Ton
Rerolling	$34.00
Forging quality	40.00

Shell Steel

	Per Gross Ton
3 in. to 12 in.	$52.00
12 in. to 18 in.	54.00
18 in. and over	56.00

Basic open hearth shell steel, f.o.b. Pittsburgh, Chicago, Buffalo, Gary, Cleveland, Youngstown and Birmingham.

Prices delivered Detroit are $2.25 higher.

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting to length, or quantity.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open hearth or bessemer	$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.90c.

Wire Rods

(No. 5 to 9/32 in.)

	Per Lb.
Pittsburgh, Chicago, Cleveland	2.00c.
Worcester, Mass.	2.10c.
Birmingham	2.00c.
San Francisco	2.50c.
Galveston	2.25c.

9/32 in. to 47/64 in., 0.15c. a lb. higher. Quantity extras apply.

Alloy Steel Blooms, Billets and Slabs

Pittsburgh, Chicago, Canton, Massillon, Buffalo, or Bethlehem, per gross ton	$54.00

TOOL STEEL

(F.o.b. Pittsburgh, Bethlehem, Syracuse)

	Base per Lb.
High speed	67c.
Straight molybdenum	54c.
Tungsten-molybdenum	57½c.
High-carbon-chromium	43c.
Oil hardening	24c.
Special carbon	22c.
Extra carbon	18c.
Regular carbon	14c.

Warehouse prices east of Mississippi are 2c. a lb. higher; west of Mississippi, 3c. higher.

CORROSION AND HEAT-RESISTING STEEL

(Per lb. base price, f.o.b. Pittsburgh)

Chromium-Nickel Alloys

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium Alloys

	No. 410	No. 430	No. 442	No. 446
F.Billets	15.725c.	16.15c.	19.125c.	23.375c.
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
Hotstrip	17.00c.	17.50c.	24.00c.	35.00c.
Cold st.	22.00c.	22.50c.	32.00c.	52.00c.

Chromium-Nickel Clad Steel (20%)

	No. 304
Plates	18.00c.*
Sheets	19.00c.

*Includes annealing and pickling.

PIG IRON

All prices set in bold face type are maxima established by OPA on June 24, 1941. Other domestic prices (in italics) are delivered quotations per gross ton computed on the basis of the official maxima.

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phosphorus	Charcoal
Boston††	***$25.53***	***$25.03***	***$26.53***	***$26.03***	.....	.....
Brooklyn	*27.65*	.....	.....	*28.15*	.....	.....
Jersey City	*26.62*	*26.12*	*27.62*	*27.12*	.....	.....
Philadelphia**	*25.89*	*25.39*	*26.89*	*26.39*	.....	.....
Bethlehem, Pa.	$25.00	$24.50	$26.00	$25.50	.....	.....
Everett, Mass.††	25.00	24.50	26.00	25.50	.....	.....
Swedeland, Pa.	25.00	24.50	26.00	25.50	.....	.....
Steelton, Pa.	.....	24.50	.....	.....	$29.50	.....
Birdsboro, Pa.	25.00	24.50	26.00	25.50	29.50	.....
Sparrows Point, Md.	25.00	24.50	.....	.....	.....	.....
Erie, Pa.	24.00	23.50	25.00	24.50	.....	.....
Neville Island, Pa.	24.00	23.50	24.50	24.00	.....	.....
Sharpsville, Pa.*	24.00	23.50	24.50	24.00	.....	.....
Buffalo	24.00	23.00	25.00	24.50	29.50	.....
Cincinnati	*24.68*	*24.68*	.....	*25.18*	.....	.....
Canton, Ohio	*25.47*	*24.97*	*25.97*	*25.47*	.....	.....
Mansfield, Ohio	*26.06*	*25.56*	*26.56*	*26.06*	.....	.....
St. Louis	*24.50*	*24.00*	.....	.....	.....	.....
Chicago	24.00	23.50	24.50	24.00	.....	*$31.34*
Granite City, Ill.	24.00	23.50	24.50	24.00	.....	.....
Cleveland	24.00	23.50	24.50	24.00	.....	.....
Hamilton, Ohio	24.00	23.50	.....	24.00	.....	.....
Toledo	24.00	23.50	24.50	24.00	.....	.....
Youngstown*	24.00	23.50	24.50	24.00	.....	.....
Detroit	24.00	23.50	24.50	24.00	.....	.....
Lake Superior fc	.....	.....	.....	.....	.....	$28.00
Lyles, Tenn. fc.†	.....	.....	.....	.....	.....	33.00
St. Paul	*26.76*	.....	*27.26*	*26.76*	.....	.....
Duluth	24.50	.....	25.00	24.50	.....	.....
Birmingham	20.38	19.00	25.00	.....	.....	.....
Los Angeles	*27.25*	.....	.....	.....	.....	.....
San Francisco	*27.25*	.....	.....	.....	.....	.....
Seattle	*27.25*	.....	.....	.....	.....	.....
Provo, Utah	22.00	.....	.....	.....	.....	.....
Montreal	*27.50*	*27.50*	.....	*28.00*	.....	.....
Toronto	*25.50*	*25.50*	.....	*26.00*	.....	.....

GRAY FORGE IRON: Valley or Pittsburgh furnace $23.50

*Pittsburgh Coke & Iron Co. (Sharpsville, Pa. furnace only) and the Struthers Iron and Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

**Pittsburgh Ferromanganese Co. (Chester furnace only) may charge $2.25 a ton over maximum basing point prices.

†Price shown is for low-phosphorous iron; high-phosphorous sells for $28.50 at the furnace.

††Eastern Gas & Fuel Associates, Boston, is permitted to sell pig iron produced by its selling company, Mystic Iron Works, Everett, Mass., at $1 per gross ton above maximum prices.

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of base grade (1.75 per cent to 2.25 per cent).

Phosphorous Differential: Basing point prices are subject to a reduction of 38c. per ton for phosphorous content of 0.70 per cent and over.

Manganese Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.50 per cent manganese content in excess of 1.00 per cent.

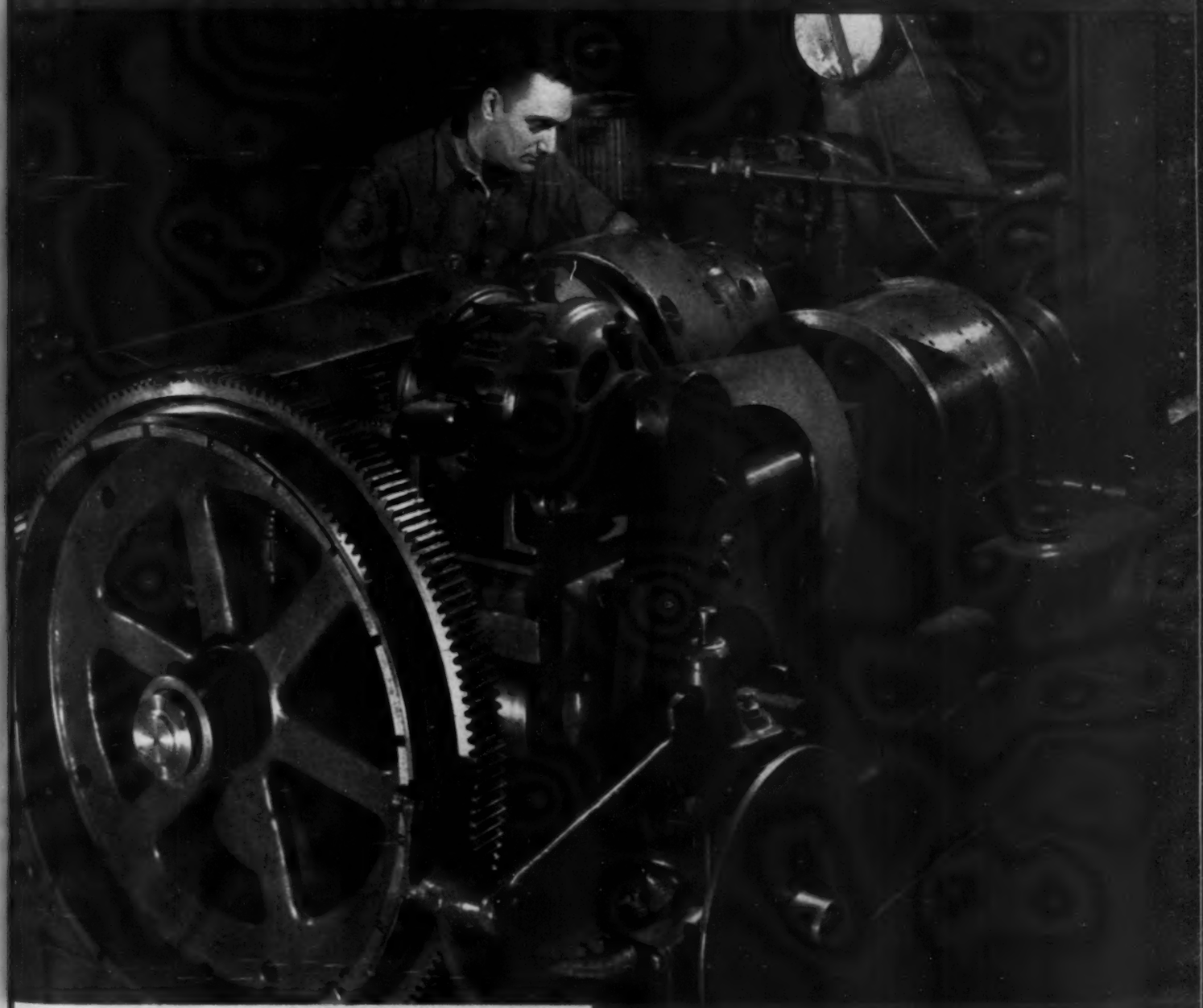
NATIONAL EMERGENCY STEELS (Hot Rolled)

Extras for Alloy Content

Designation	CHEMICAL COMPOSITION LIMITS, PER CENT									Basic Open-Hearth		Electric Furnace	
	Carbon	Manganese	Phosphorus Max.	Sulphur Max.	Silicon	Nickel	Chromium	Molybdenum	Vanadium	Bars & Bar-Strip	Billets, Blooms, & Slabs	Bars & Bar-Strip	Billets, Blooms, & Slabs
NE 8024	.22/.28	1.00/1.30	.040	.040	.20/.35	.....	.....	.10/.20	.....	.45c	$ 9.00	.95c	$19.00
NE 8124	.22/.28	1.30/1.60	.040	.040	.20/.35	.....	.....	.25/.35	.....	.85	17.00	1.35	27.00
NE 8233	.30/.36	1.30/1.60	.040	.040	.20/.35	.....	.....	.10/.20	.....	.65	13.00	1.15	23.00
NE 8245	.42/.49	1.30/1.60	.040	.040	.20/.35	.....	.....	.10/.20	.....	.65	13.00	1.15	23.00
NE 8339	.35/.42	1.30/1.60	.040	.040	.20/.35	.....	.....	.20/.30	.....	.75	15.00	1.25	25.00
NE 8442	.38/.45	1.30/1.60	.040	.040	.20/.35	.....	.....	.30/.40	.....	.90	18.00	1.40	28.00
NE 8447	.43/.50	1.30/1.60	.040	.040	.20/.35	.....	.....	.30/.40	.....	.90	18.00	1.40	28.00
NE 8547	.43/.50	1.30/1.60	.040	.040	.20/.35	.....	.....	.40/.60	.....	1.25	25.00	1.75	35.00
NE 8620	.18/.23	.70/.95	.040	.040	.20/.35	.40/.60	.40/.60	.15/.25	.....	.75	15.00	1.25	25.00
NE 8630	.27/.33	.70/.95	.040	.040	.20/.35	.40/.60	.40/.60	.15/.25	.....	.75	15.00	1.25	25.00
NE 8724	.22/.28	.70/.95	.040	.040	.20/.35	.40/.60	.40/.60	.20/.30	.....	.80	16.00	1.30	26.00
NE 8739	.35/.42	.75/1.00	.040	.040	.20/.35	.40/.60	.40/.60	.20/.30	.....	.80	16.00	1.30	26.00
NE 8744	.40/.47	.75/1.00	.040	.040	.20/.35	.40/.60	.40/.60	.20/.30	.....	.80	16.00	1.30	26.00
NE 8749	.45/.52	.75/1.00	.040	.040	.20/.35	.40/.60	.40/.60	.20/.30	.....	.80	16.00	1.30	26.00
NE 8817	.15/.20	.70/.95	.040	.040	.20/.35	.40/.60	.40/.60	.30/.40	.....	.90	18.00	1.40	28.00
NE 8949	.45/.52	1.00/1.30	.040	.040	.20/.35	.40/.60	.40/.60	.30/.40	.....	1.20	24.00	1.70	34.00

Note: The extras shown above are in addition to a base price of 2.70c. per 100 lb., on finished products and $54. per gross ton on semi-finished steel major basing points and are in cents per 100 lb. and dollars per gross ton in semi-finished.

NEW ENGLAND GRINDING MACHINE BUILDER PREVENTS "BOTTLE-NECKS" WITH CLEVELAND *Single Spindle* AUTOMATICS



• A large grinding machine builder in New England recently installed a battery of Cleveland *Single Spindle* Automatics in his production line to speed up building of his own machines, at present mostly absorbed by the aircraft industry. Results of this installation have been gratifying and note-worthy. "Bottle-necks" have been broken, production pyramided, costs cut down rapidly. Aircraft plants are getting precision grinding machines a little faster than was possible before because of the efficiency and flexibility of these Cleveland Automatics. • Descriptive bulletins on the size you can use in your production are ready to send you.

THE CLEVELAND AUTOMATIC MACHINE COMPANY
2269 ASHLAND ROAD, CLEVELAND, OHIO

Sales Offices at

Chicago, 565 W. Washington Street • *Detroit*, 540 New Center Bldg.
Newark, 702 American Insurance Bldg. • *Cincinnati*, 507 American Bldg.

CLEVELAND *Single Spindle* AUTOMATICS

ELECTRICAL SHEETS

(Base, f.o.b. Pittsburgh)

	Per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Motor	4.95c.
Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

F.o.b. Granite City, add 10c. per 100 lb. on field grade to and including dynamo. Pacific ports add 75c. per 100 lb. on all grades.

WIRE PRODUCTS

To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham

	Base per Keg
Standard wire nails	$2.55
Coated nails	2.55
Cutnails, carloads	3.85
	Base per 100 Lb.
Annealed fence wire	$3.05
Annealed galvanized fence wire	3.40
	Base Column
Woven wire fence*	67
Fence posts (carloads)	69
Single loop bale ties	59
Galvanized barbed wire†	70
Twisted barbless wire	70

*15½ gage and heavier. †On 80-rod spools in carload quantities.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh, per Package of 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C.	$6.00	$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.00
25-lb. coating I.C.	8.00	16.00
30-lb. coating I.C.	8.63	17.25
40-lb. coating I.C.	9.75	19.50

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent off List
Machine and Carriage Bolts:	
½ in. & smaller x 6 in. & shorter	65½
9/16 & ⅝ in. x 6 in. & shorter	63½
¾ to 1 in. x 6 in. & shorter	61
1⅛ in. and larger, all length	59
All diameters over 6 in. long	59
Lag, all sizes	62
Plow bolts	65
Nuts, Cold Punched or Hot Pressed: *(Hexagon or Square)*	
½ in. and smaller	62
9/16 to 1 in. inclusive	59
1⅛ to 1½ in. inclusive	57
1⅝ in. and larger	56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments.

Semi-Fin. Hexagon Nuts	U.S.S.	S.A.E.
7/16 in. and smaller	..	64
½ in. and smaller	62	..
½ in. through 1 in.	..	60
9/16 to 1 in.	59	..
1⅛ in. through 1½ in.	57	58
1⅝ in. and larger	56	..

In full container lots, 10 per cent additional discount.

Stove bolts, packages, nuts loose	71 and 10
Stove bolts in packages, with nuts attached	71
Stove bolts in bulk	80

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York on lots of 200 lb. or over.

Large Rivets *(½ in. and larger)*

	Base per 100 lb.
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	$3.75

Small Rivets *(7/16 in. and smaller)*

	Per Cent Off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	65 and 5

Cap and Set Screws *Per Cent Off List*

Upset full fin. hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in.	64
Upset set screws, cup and oval points	71
Milled studs	46
Flat head cap screws, listed sizes	36
Filister head cap, listed sizes	51

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills
(F.o.b. Pittsburgh only on wrought pipe)
Base Price—$200 per Net Ton

Steel (Butt Weld)

	Black	Galv.
½ in.	63½	51
¾ in.	66½	55
1 to 3 in.	68½	57½

Wrought Iron (Butt Weld)

½ in.	24	3½
¾ in.	30	10
1 and 1¼ in.	34	16
1½ in.	38	18½
2 in.	37½	18

Steel (Lap Weld)

2 in.	61	49½
2½ and 3 in.	64	52½
3½ to 6 in.	66	54½

Wrought Iron (Lap Weld)

2 in.	30½	12
2½ to 3½ in.	31½	14½
4 in.	33½	18
4½ to 8 in.	32½	17

Steel (Butt, extra strong, plain ends)

	Black	Galv.
½ in.	61½	50½
¾ in.	65½	54½
1 to 3 in.	67	57

Wrought Iron (Same as Above)

½ in.	25	6
¾ in.	31	12
1 to 2 in.	38	19½

Steel (Lap, extra strong, plain ends)

2 in.	59	48½
2½ and 3 in.	63	52½
3½ to 6 in.	66½	56

Wrought Iron (Same as Above)

2 in.	33⅓	15½
2½ to 4 in.	39	22½
4½ to 6 in.	37½	21

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or $2 a ton higher on all butt weld.

WAREHOUSE PRICES

(Delivered Metropolitan areas, per 100 lb. These prices do not necessarily apply for dislocated tonnage shipments when the f.o.b. City prices are used in conformance with OPA Schedule 49)

CITIES	SHEETS			STRIP		Plates (¼ in. and heavier)	Structural Shapes	BARS		ALLOY BARS			
	Hot Rolled (10 ga.)	Cold Rolled	Galv. (24 ga.)	Hot Rolled	Cold Rolled			Hot Rolled	Cold Finished	Hot Rolled 2300	Hot Rolled 3100	Cold Drawn 2300	Cold Drawn 3100
Pittsburgh	$3.35	....	$4.65	$3.60	$3.20	$3.40	$3.40	$3.35	$3.65	$7.45	$5.75	$8.40	$6.75
Chicago	3.25	4.10	4.85[1]	3.60	3.50	3.55	3.55	3.50	3.75	7.35	5.65	8.40	6.75
Cleveland	3.35	4.05	4.62	3.50	3.20	3.40	3.58	3.25	3.75	7.55	5.85	8.40	6.75
Philadelphia	3.55	4.05[5]	4.65	3.51	3.31	3.55	3.55	3.85	4.06	7.31	5.86	8.56	7.16
New York	3.58	4.60[2]	5.00	3.98[6]	3.51	3.76	3.75	3.84	4.09	7.60	5.90	8.84	7.19
Detroit	3.43	4.30	4.84[1]	3.68[6]	3.40	3.60	3.65	3.43	3.80	7.67	5.97	8.70	7.05
Buffalo	3.25	4.30[1]	4.75[4]	3.62	3.62	3.62	3.40	3.35	3.75	7.35	5.65	8.40	6.75
Boston	3.71	4.68	5.11	4.06	3.46	3.85	3.85	3.98	4.13	7.75	6.05	8.88	7.23
Birmingham	3.45[3]	....	4.75[1]	3.70[3]	....	3.55[3]	3.55[3]	3.50[3]	4.48	....	....	....	....
St. Louis	3.39	4.24[5]	4.99[1]	3.74	3.61	3.69	3.69	3.64	4.02	7.72	6.02	8.77	7.12
St. Paul	3.50	4.35	5.00	3.85	3.83	3.80	3.80	3.75	4.34	7.45	6.00	8.84	7.44
Milwaukee	3.38	4.23[2]	4.98[1]	3.73	3.54	3.68	3.68	3.68	3.88	7.58	5.88	8.63	6.98
Baltimore	3.50	....	5.05	4.00	....	3.70	3.70	3.85	4.04	....	....	....	....
Cincinnati	3.42	4.37[2]	4.42[1]	3.67	3.45	3.65	3.68	3.60	4.00	7.69	5.99	8.50	7.10
Norfolk	3.85	....	5.40	4.10	....	4.05	4.05	4.00	4.15	....	....	....	....
Washington	3.60	....	....	4.10	....	3.80	3.80	3.95	4.10	....	....	....	....
Indianapolis	3.45	4.25	5.01[1]	3.75	3.28	3.70	3.70	3.60	3.97	7.67	5.97	8.72	7.07
Omaha	3.85	....	5.52[1]	4.20	....	4.15	4.15	4.10	4.42	....	....	....	....
Memphis	3.85	....	5.25	4.10	....	3.95	3.95	3.90	4.31	....	....	....	....
New Orleans	4.05	....	....	4.30	....	3.90	3.90	4.10	4.60	....	....	....	....
Houston	4.00	....	....	4.30	....	4.05	4.05	3.75	....	....	....	....	....
Los Angeles †	4.95	7.15	5.95	4.90	....	4.90	4.60	4.35	6.60	9.55	8.55	10.55	9.55
San Francisco†	4.55	7.05	6.10	4.50	....	4.65	4.35	3.95	6.80	9.80	8.80	10.80	9.80
Seattle†	4.65[7]	....	5.70[7]	4.25	....	4.75	4.45	4.20	5.75	....	8.00	....	....

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb., galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over. Exceptions: [1] 500 to 1499 lb. [2] 400 to 1499 lb. [3] 400 to 3999 lb. [4] 450 to 1499 lb. [5] 1000 to 1999 lb. [6] 0 to 1999 lb. [7] 300 to 10,000 lb. At Philadelphia galvanized sheets, 25 or more bundles; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; San Francisco, hot rolled sheets, 400 to 39,999 lb., galvanized and cold rolled sheets, 750 to 4999 lb., cold fin. bars, 0-299 lb.; hot rolled alloy bars, 0-4999 lb.; Seattle, cold finished bars, 1000 lb. and over, hot rolled alloy bars, 0-1999 lb.; Memphis, hot rolled sheets, 400 to 1999 lb., galvanized sheets, 150 and over; St. Paul, galvanized and cold rolled sheets, any quantity, hot rolled bars, plates, shapes, hot rolled sheets, 400 to 14,999 lb.; Los Angeles, hot rolled sheets, bars, plates, cold rolled sheets, 300 to 1999 lb.; galvanized sheets, 1 to 6 bundles; cold finished bars, 1 to 99 lb.; SAE bars, 100 lb. Extras for size, quality, etc., apply on above quotations. * 12 gage and heavier, $3.43. †Los Angeles, San Francisco and Seattle prices reflect special provisions of amendment No. 2 to OPA Price Schedule No. 49.

Ships are Forgings

And ships are a primary need of the day—fighting ships, troop transports, supply ships, tankers and other craft for use on inland waterways, in coastal service and in the inter-continental hauling of vast quantities of men and materials.

We're beating plow shares into swords 168 hours a week making rugged, stress resisting ship forgings for stem and stern, fighting tower and keel, and a thousand places in between.

While our facilities are crowded, we still want to serve more ship, tank, plane, gun, ordnance and machine tool builders. We'll stretch our production capacity, burn more midnight oil, do the impossible to assure rapid, intelligent handling of their forging needs.

It is our fervent desire to speed the day when free men can again travel the high seas, engage in free enterprise and follow the normal pursuits of industry.

Proudly we fly the Navy "E" flag awarded for excellence and proficiency in the production of Naval materiel.

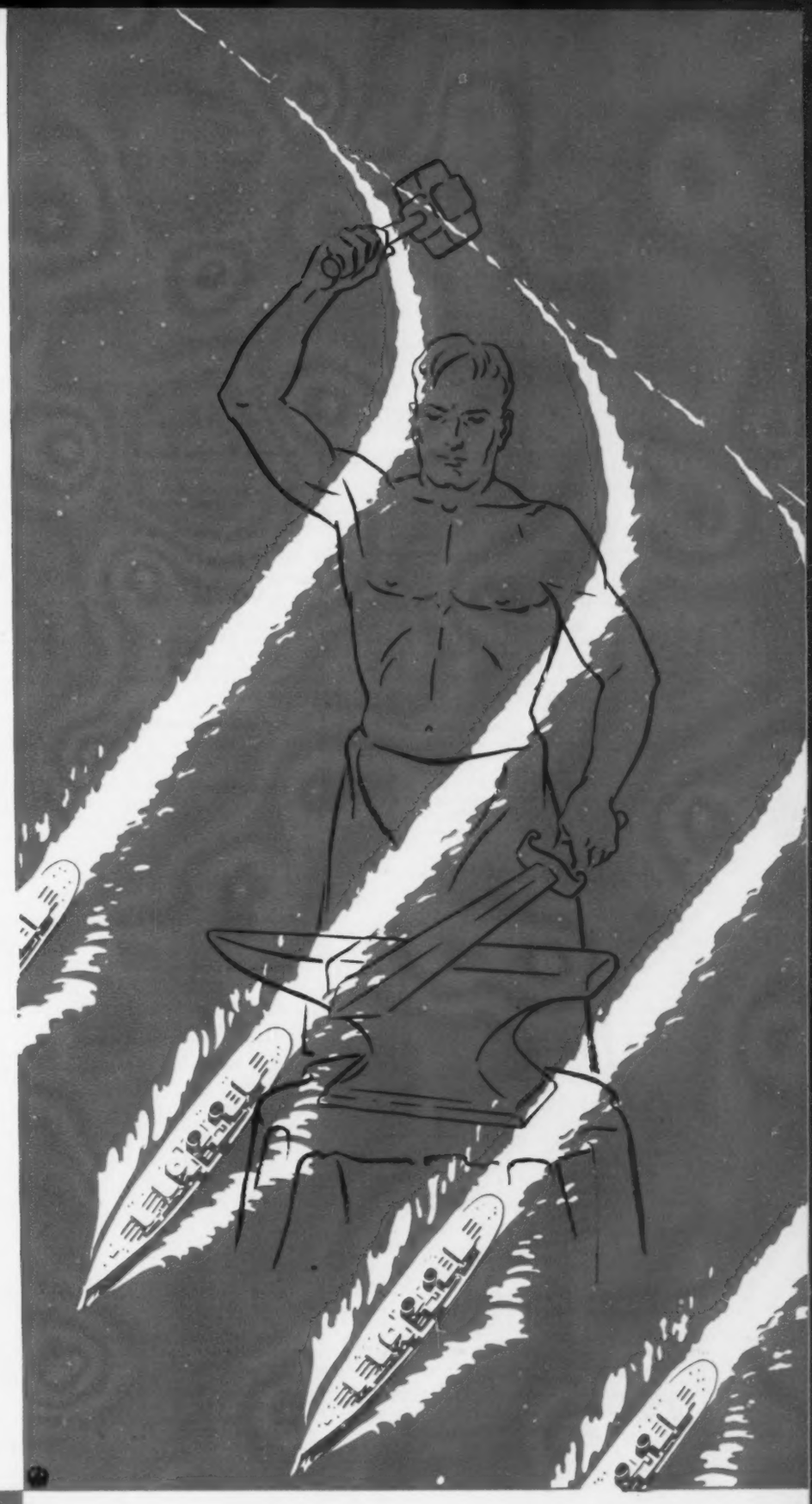
KROPP FORGE COMPANY

Makers of Drop, Upset and Hammer Forgings for Ships, Guns, Planes, Tanks, Ordnance and Machine Tools

World's Largest Job Forging Shop

5301 W. ROOSEVELT ROAD, CHICAGO, ILL.

Representatives in Principal Cities



SERVING INDUSTRY SINCE 18 37 OVER 100 YEARS

K

KROPP FORGE CO.

KROPP

BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes Minimum Wall
(Net base prices per 100 ft., f.o.b. Pittsburgh, in carload lots)

	Seamless Cold Drawn	Seamless Hot Rolled	Lap Weld, Hot Rolled
	$	$	$
2 in. o.d. 13 B.W.G.	15.03	13.04	12.38
2½ in. o.d. 12 B.W.G.	20.21	17.54	16.58
3 in. o.d. 12 B.W.G.	22.48	19.50	18.35
3½ in. o.d. 11 B.W.G.	28.37	24.62	23.15
4 in. o.d. 10 B.W.G.	35.20	30.54	28.66

(Extras for less carload quantities)

40,000 lb. or ft. over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

CAST IRON WATER PIPE

	Per Net Ton
6-in. and larger, del'd Chicago	$54.80
6-in. and larger, del'd New York	52.20
6-in. and larger, Birmingham	46.00
6-in. and larger f.o.b. cars, San Francisco or Los Angeles	69.40
6-in. and larger f.o.b. cars, Seattle	71.20

Class "A" and gas pipe, $3 extra; 4-in. pipe is $3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger is $45 at Birmingham and $53.80 delivered Chicago. $59.40 at San Francisco and Los Angeles, and $70.20 at Seattle.

RAILS, TRACK SUPPLIES

(F.o.b. Mill)

Standard rails, heavier than 60 lb., gross ton	$40.00
Angle bars, 100 lb.	2.70
(F.o.b. Basing Points)	*Per Gross Ton*
Light rails (from billets)	$40.00
Light rails (from rail steel)	39.00
	Base per Lb.
Cut spikes	3.00c.
Screw spikes	5.15c.
Tie plates, steel	2.15c.
Tie plates, Pacific Coast	2.30c.
Track bolts	4.75c.
Track bolts, heat treated, to railroads	5.00c.
Track bolts, jobbers discount	60-5

Basing Points, light rails—Pittsburgh, Chicago, Birmingham; spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo; spikes alone—Youngstown, Lebanon, Pa., Richmond

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans, Domestic, 80%, per gross ton (carloads) $135.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%	$36.00
Domestic, 26 to 28%	49.50

Electric Ferrosilicon

(Per Gross Ton, Delivered Lump Size)

50% (carload lots, bulk)	$74.50
50% (ton lots, packed)	87.00
75% (carload lots, bulk)	135.00
75% (ton lots, packed)	151.00

Silvery Iron

(Per Gross Ton, base 6.00 to 6.50 Si)

F.o.b. Jackson, Ohio $29.50*
Buffalo 30.75*
For each additional 0.50% silicon add $1 a ton. For each 0.50% manganese over 1% add 50c. a ton. Add $1 a ton for 0.75% phosphorus or over.
*Official OPA price established June 24, 1941.

Bessemer Ferrosilicon

Prices are $1 a ton above Silvery Iron quotations of comparable analysis.

Ferrochrome

(Per Lb., Contained Cr, Delivered Carlots, Lump Size, on Contract)

4 to 6 carbon	13.00c.
2 carbon	19.50c.
1 carbon	20.50c.
0.10 carbon	22.50c.
0.06 carbon	23.00c.

Spot prices are ¼c. per lb. of contained chromium higher.

Silico-Manganese

(Per Gross Ton, Delivered, Lump Size, Bulk, on Contract)

3 carbon	$113.00*
2.50 carbon	118.00*
2 carbon	123.00*
1 carbon	133.00*

Other Ferroalloys

Ferrotungsten, per lb. contained W, del'd carload	$2.00
Ferrotungsten, 100 lb. and less	2.25
Ferrovanadium, contract, per lb. contained V, del'd	$2.70 to $2.90†
Ferrocolumbium, per lb. contained Cb, f.o.b. Niagara Falls, N. Y., ton lots	$2.25†
Ferrocarbontitanium, 15-18 Ti, 7-8 C, f.o.b. furnace, carload contract, net ton	$142.50
Ferrocarbontitanium, 17-20 Ti, 3-5 C, f.o.b. furnace, carload contract, net ton	$157.50
Ferrophosphorus, electric or blast furnace materials, carloads, f.o.b. Anniston, Ala., for 18%, with $3 unitage freight, equaled with Rockdale, Tenn., gross ton	$58.50
Ferrophosphorus, electrolytic 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., $3 unitage, freight equalized with Nashville, gross ton	$75.00
Ferromolybdenum, per lb., Mo, f.o.b. furnace	95c.
Calcium molybdate, per lb. Mo., f.o.b. furnace	80c.
Molybdenum oxide briquettes 48-52 Mo, per lb. contained Mo, f.o.b. Langeloth, Pa.	80c.
Molybdenum oxide, in cans, per lb. contained Mo, f.o.b. Langeloth, and Washington, Pa.	80c.

*Spot prices are $5 per ton higher.
†Spot prices are 10c. per lb. of contained element higher.

FLUORSPAR

Fire Clay Brick	*Per Net Ton*
Domestic washed gravel, 85-5 f.o.b. Kentucky and Illinois mines, all rail	$25 00
Domestic, f.o.b. Ohio River landing barges	25 00
No. 2 lump, 85-5 f.o.b. Kentucky and Illinois mines	25 00
Foreign, 85% calcium fluoride, not over 5% Ci, c.i.f. Atlantic ports, duty paid	Nominal
Domestic No. 1 ground bulk, 95 to 98%, calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	$34.00
As above, in bags, f.o.b. same mines	36.40

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick

	Per 1000
Super-duty brick, St. Louis	$64.60
First quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	51.30
First quality, New Jersey	56.00
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	46.55
Second quality, New Jersey	51.00
No. 1, Ohio	43.00
Ground fire clay, net ton	7.60

Silica Brick

Pennsylvania	$51.30
Chicago District	58.90
Birmingham	51.30
Silica cement, net ton (Eastern)	9.00

Chrome Brick

	Per Net Ton
Standard, f.o.b. Baltimore, Plymouth Meeting and Chester	$54.00
Chemically bonded, f.o.b. Baltimore, Plymouth Meeting and Chester Pa.	54.00

Magnesite Brick

Standard f.o.b. Baltimore and Chester	$76.00
Chemically bonded, f.o.b. Baltimore	65.00

Grain Magnesite

Domestic, f.o.b. Baltimore and Chester in sacks (carloads)	$44.00
Domestic, f.o.b. Chewelah, Wash. (in bulk)	22.00

ORES

Lake Superior Ores (51.50% Fe.)

(Delivered Lower Lake Ports)

	Per Gross Ton
Old range, bessemer, 51.50	$4.75
Old range, non-bessemer, 51.50	4.60
Mesaba, bessemer, 51.50	4.60
Mesaba, non-bessemer, 51.50	4.45
High phosphorus, 51.50	4.35

*Foreign Ores**

(C.i.f. Philadelphia or Baltimore, Exclusive of Duty)

	Per Unit
African, 46-48 Mn	70c.-75c.
Indian, 48-50 Mn	75c.
Brazilian, 46-48 Mn	81c. to 83c.
Cuban, 51 Mn	85c.
	Per Short Ton Unit
Tungsten, Chinese, Wolframite, duty paid, delivered	$24 to $26
Tungsten, domestic scheelite, at mine	$24 to $25
Chrome ore, lump, c.i.f. Atlantic Seaboard, per gross ton; South African (low grade)	$28 to $30
Rhodesian, 45	Nom.
Rhodesian, 48	Nom.

*Importations no longer readily available. Prices shown are nominal.

COKE*

Furnace

	Per Net Ton
†Connellsville, prompt	$6.00

Foundry

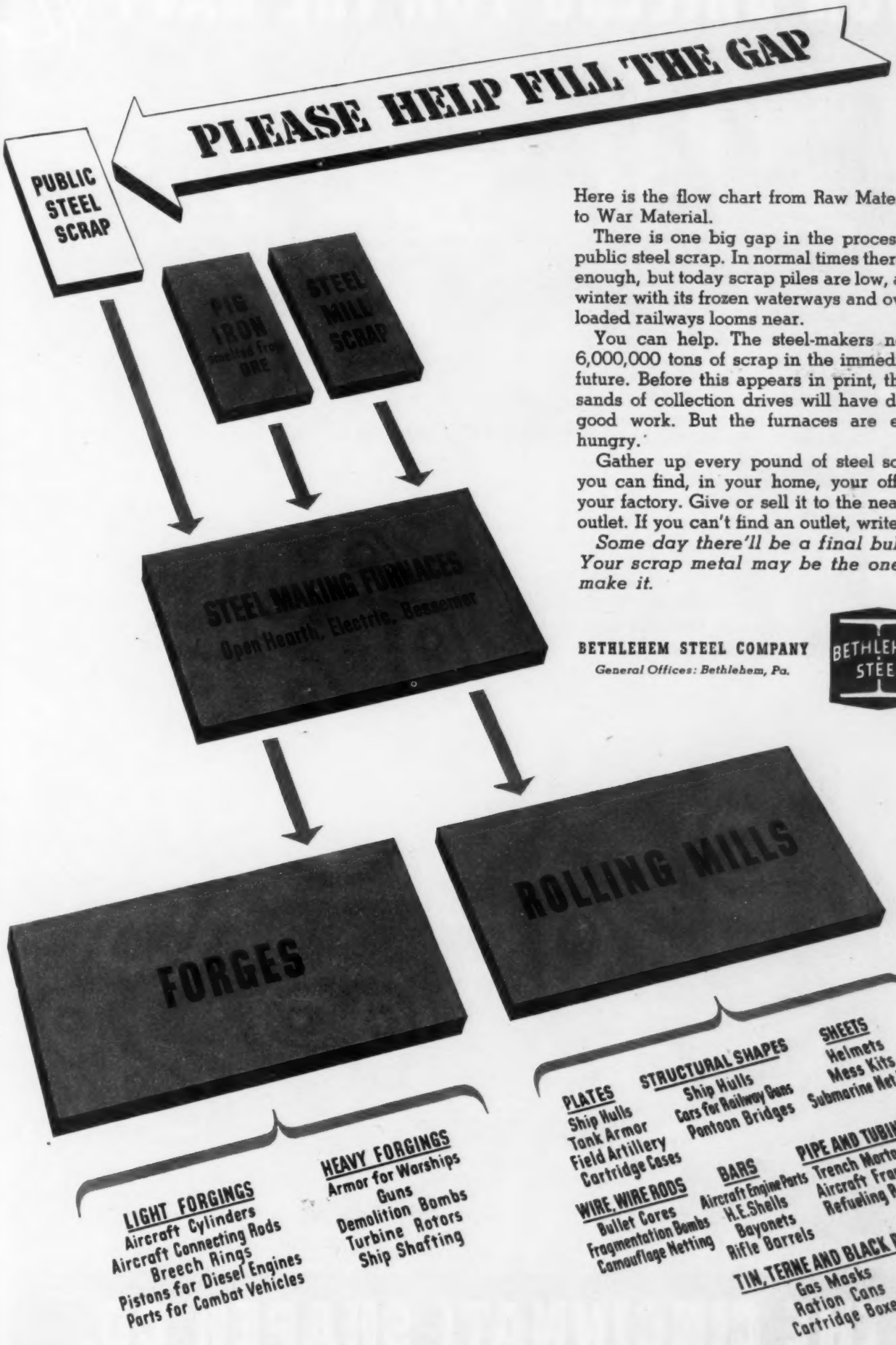
†Connellsville, prompt ..... $6.75 to $7.00

*Maximum by-product coke prices established by OPA became effective Oct. 1, 1941. A complete schedule of the ceiling prices was published in THE IRON AGE, Sept. 25, p. 94B. Maximum beehive furnace coke prices established by OPA, Jan. 26. †F.O.B. oven.

By-product, Chicago	$12.25
By-product, New England	$13.75
By-product, Newark	$12.40 to $12.95
By-product, Philadelphia	$12.38
By-product, Cleveland	$12.30
By-product, Cincinnati	$11.75
By-product, Birmingham	$8.50†
By-product, St. Louis	$12.02
By-product, Buffalo	$12.50

FUEL OIL

No. 6 Bur. Stsd., del'd Chicago	4.75c.
No. 3 distillate del'd Cleveland	6.50c.
No. 4 indus., del'd Cleveland	6.00c.
No. 5 indus., del'd Cleveland	5.25c.
No. 6 indus., del'd Cleveland	5.25c



Here is the flow chart from Raw Material to War Material.

There is one big gap in the process—public steel scrap. In normal times there is enough, but today scrap piles are low, and winter with its frozen waterways and overloaded railways looms near.

You can help. The steel-makers need 6,000,000 tons of scrap in the immediate future. Before this appears in print, thousands of collection drives will have done good work. But the furnaces are ever hungry.

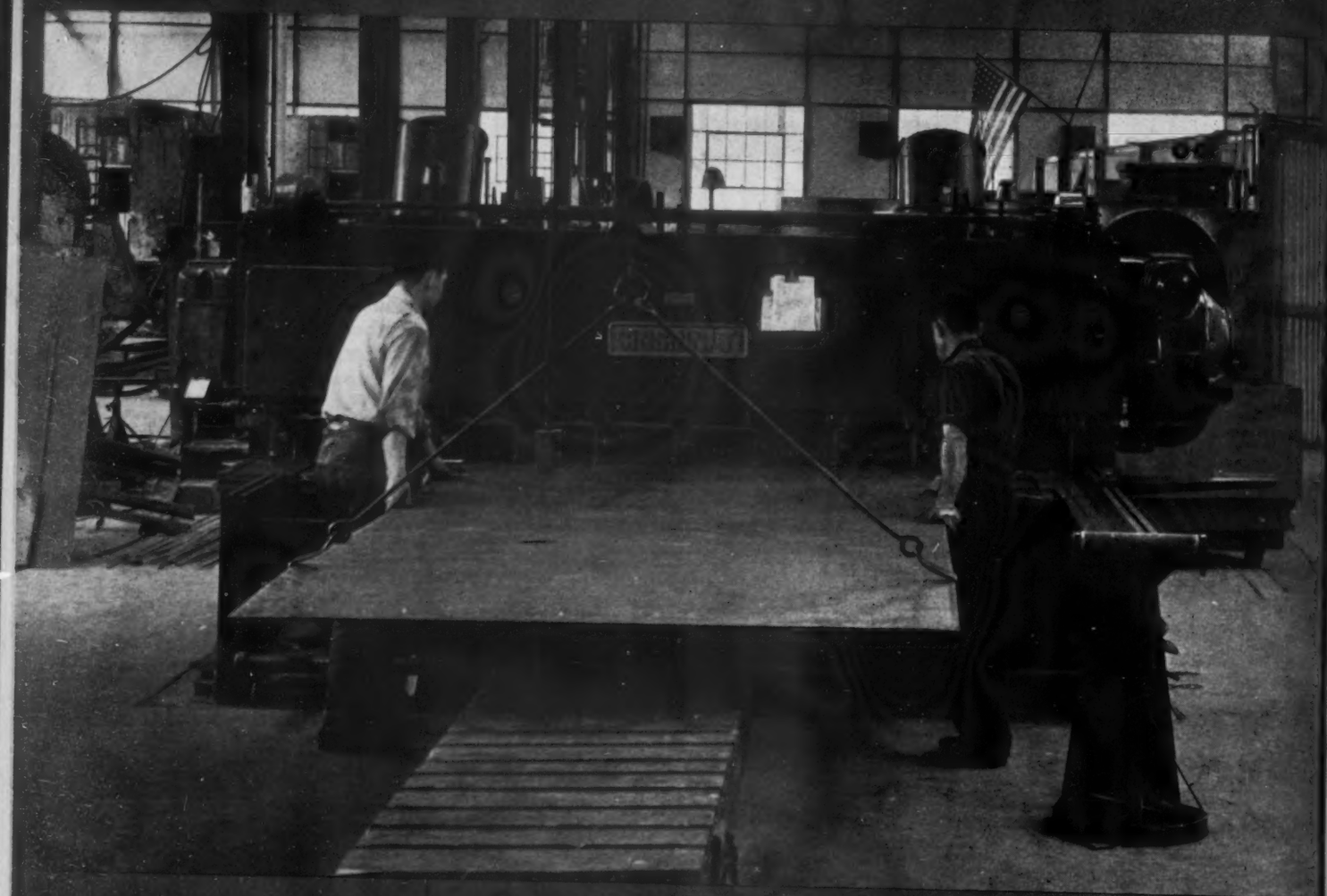
Gather up every pound of steel scrap you can find, in your home, your office, your factory. Give or sell it to the nearest outlet. If you can't find an outlet, write us.

Some day there'll be a final bullet. Your scrap metal may be the one to make it.

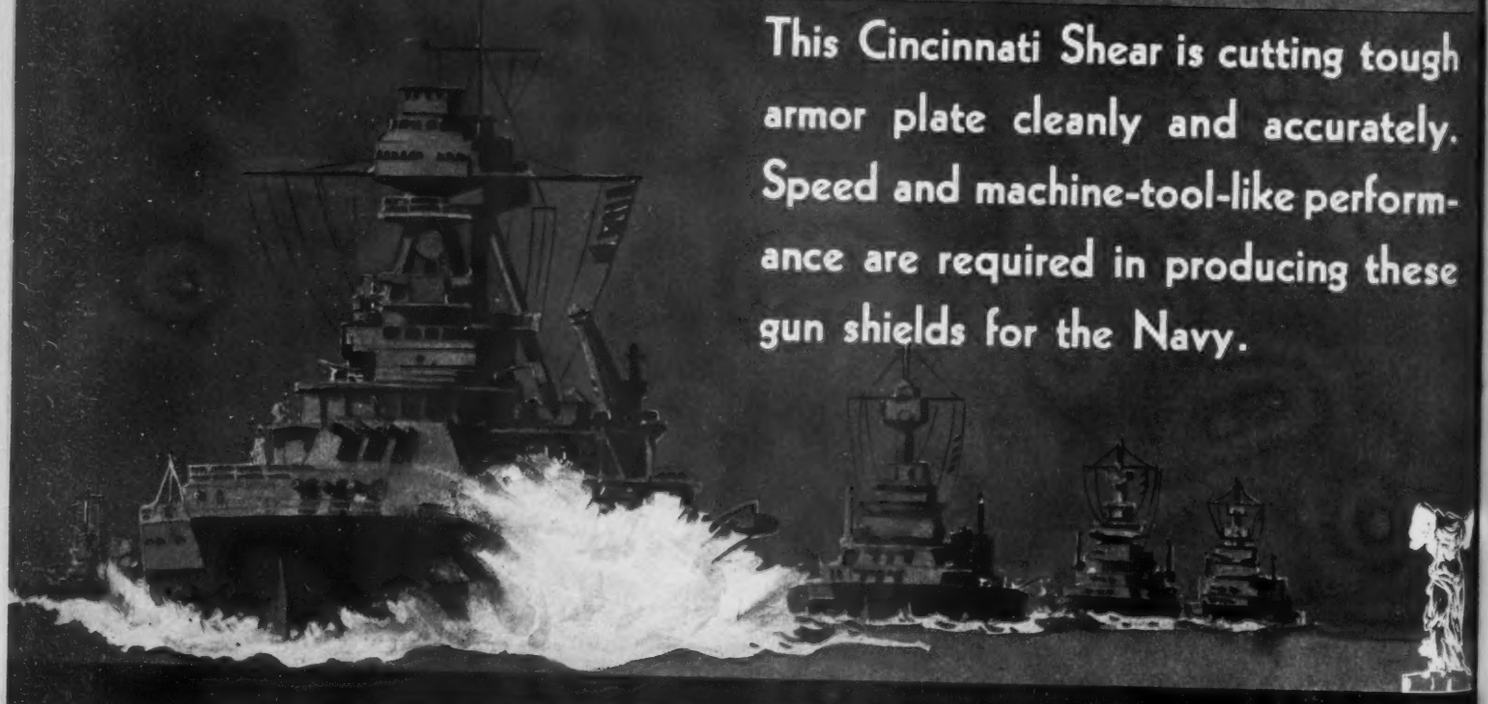
BETHLEHEM STEEL COMPANY
General Offices: Bethlehem, Pa.

BETHLEHEM STEEL

★ GUN SHIELDS FOR THE NAVY



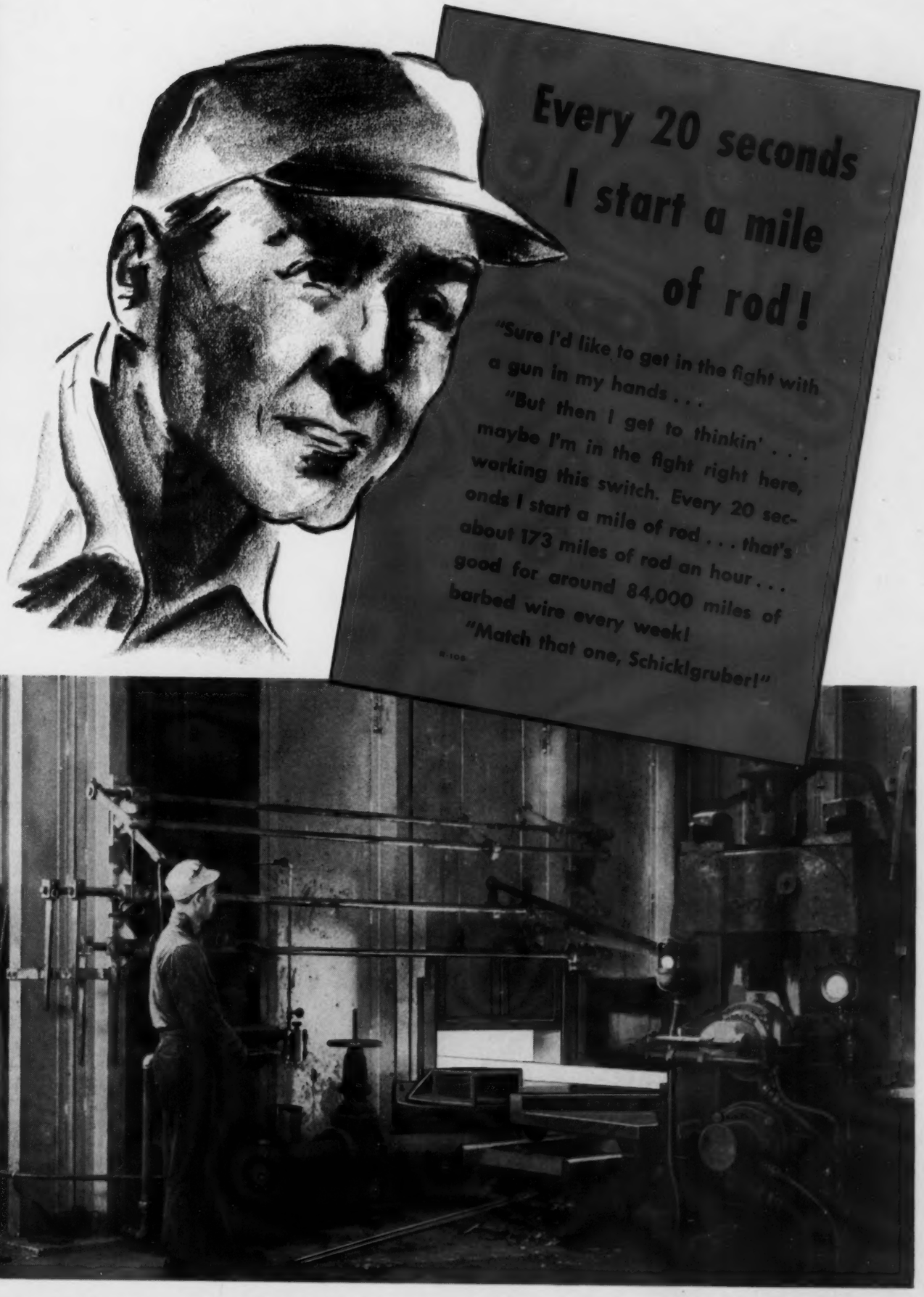
This Cincinnati Shear is cutting tough armor plate cleanly and accurately. Speed and machine-tool-like performance are required in producing these gun shields for the Navy.



THE CINCINNATI SHAPER CO.

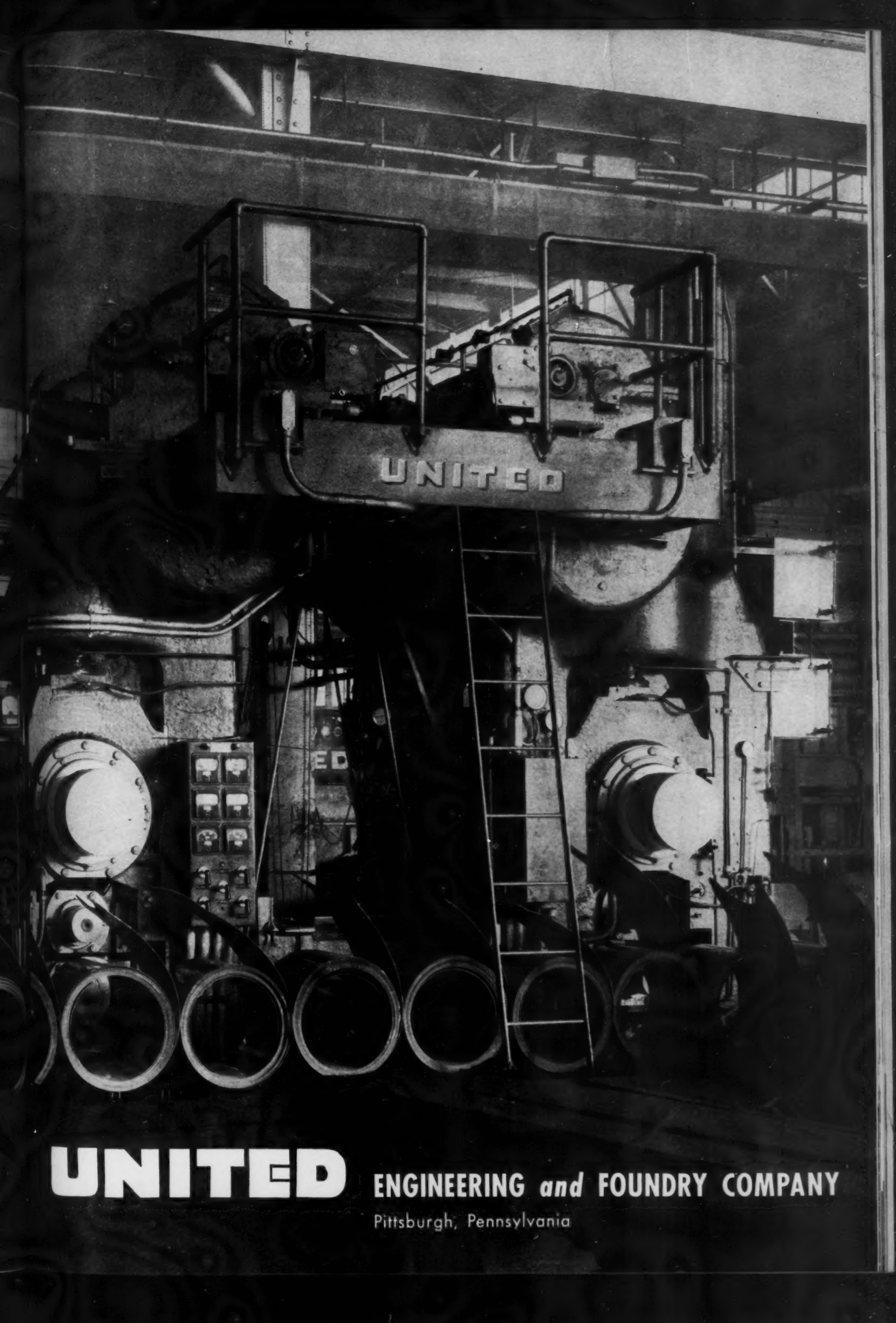
SHAPERS • SHEARS • BRAKES

CINCINNATI, OHIO


Every 20 seconds I start a mile of rod!
"Sure I'd like to get in the fight with a gun in my hands . . .
"But then I get to thinkin' . . . maybe I'm in the fight right here, working this switch. Every 20 seconds I start a mile of rod . . . that's about 173 miles of rod an hour . . . good for around 84,000 miles of barbed wire every week!
"Match that one, Schicklgruber!"

MORGAN CONSTRUCTION COMPANY • WORCESTER, MASS.

ANOTHER
UNITED
INSTALLATION
ROLLING FOR
VICTORY
FOR VICTORY
BUY
U.S.
DEFENSE
BONDS
STAMPS



UNITED ENGINEERING *and* FOUNDRY COMPANY

Pittsburgh, Pennsylvania

parts remain

bright

AS A NEW PENNY

thanks to Tide Water Cutting Oil

No more time out between runs for cleaning machines and changing oil when production shifts from steel to brass to aluminum – not since Tide Water Cutting Oil went to work in this plant. No more squawks from the plating department about tarnished parts. Over five years performance on precision machining work in this plant has shown that Tide Water Cutting Oil keeps production at peak and machined parts "bright as a new penny."

This valuable aid to increased production is helping hundreds of busy plants achieve longer tool life, and fewer work interruptions. On a drawing operation with soft aluminum sheets, scrap loss dropped from 50% to 3% thanks to Tide Water Cutting Oil.

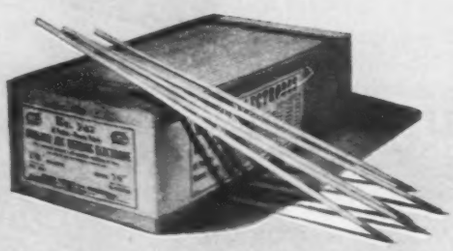
If lubrication or cutting problems are affecting your production schedules a Tide Water engineer can help you. He will recommend the Tide Water lubricant to fit your particular needs. For full information write today to Tide Water Associated Oil Company, 17 Battery Place, New York.

DRUMS! DRUMS! DRUMS! DRUMS!
War needs make it extremely important that all empty drums be returned immediately.

TIDE WATER ASSOCIATED OIL COMPANY
EASTERN DIVISION: 17 BATTERY PLACE, NEW YORK
Regional Offices: Boston, Philadelphia, Pittsburgh, Charlotte, N. C.

MAKERS OF THE FAMOUS VEEDOL MOTOR OIL

FOR FAST, UNINTERRUPTED P

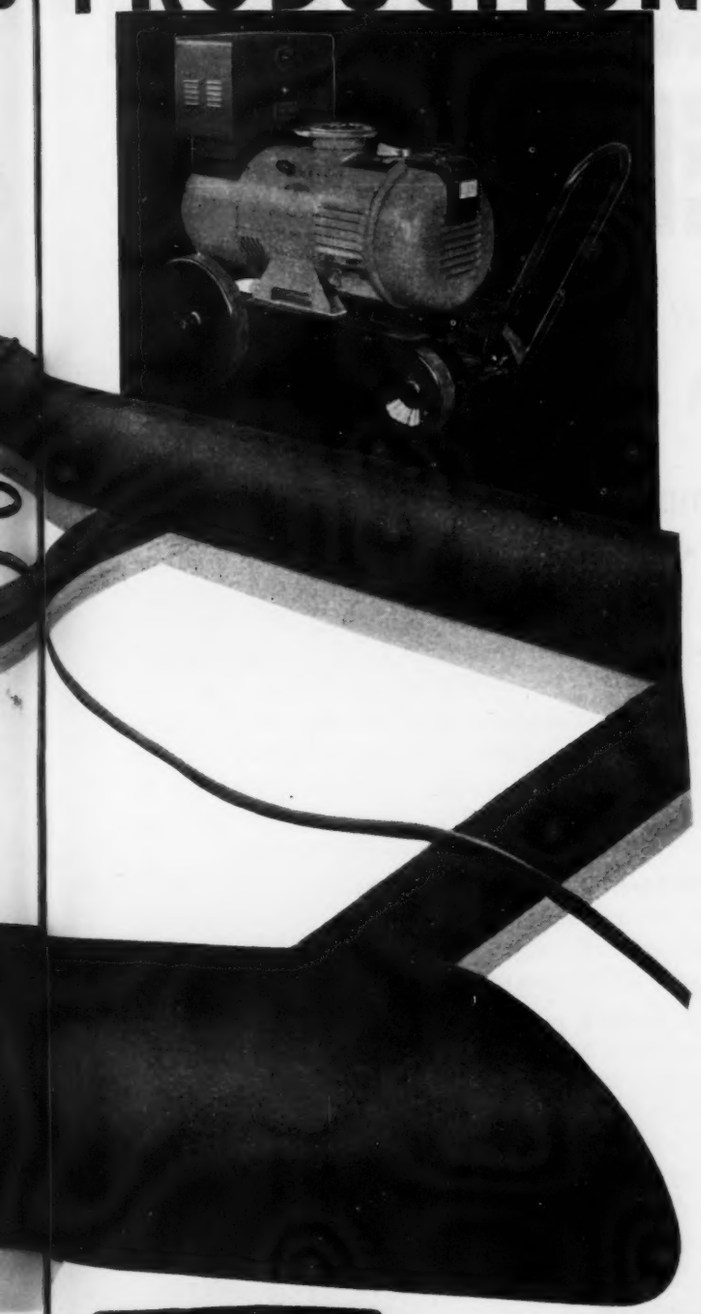


FOR GENERAL PURPOSE WELDING OF MILD STEEL

Exceptionally flat faced fillets are easily produced with the No. 98N electrode in any position due to its pulsating spray type arc and the quick solidification of the deposited metal. These characteristics of 98N also result in higher welding speeds.

WILSON WELDER AND METALS

PRODUCTION . . . weld with a WILSON "HORNET"



Back your operators with Wilson "Hornet" arc welders and they can spend more time welding — less adjusting. This is possible because the "Hornet" has the quickest recovery, the hottest arc, the best welding characteristics. Easy to start, with no electrode sticking, no "pop-outs", low spatter loss, excellent penetration and a forceful arc, the "Hornet" makes every working hour a production hour. The conveniently located hand wheel on top of the machine provides single stepless control over a wide range.

Welding operators prefer the "Hornet" for its smooth, quiet operation, its all-round working efficiency. All live and moving parts are fully enclosed.

EXTRA SPEED ON HEAVY STEEL WELDING CALLS FOR A STROCO CRATER ELIMINATOR

Crater depressions and their ever present porosity and weakening gas pockets are out — when your Wilson "Hornet" is equipped with a Stroco Crater Eliminator. When welding heavy metal, it prevents harmful craters, through a gradual fading of the arc. This eliminator saves time otherwise lost removing craters and refilling with new metal.

CO., INC.

***General Offices:* 60 East 42nd St., New York, N. Y.**

WILSON

WARTIME LIGHTING COSTS REDUCED!

General Electric announces a 12% to 17% reduction in the price of G-E MAZDA FLUORESCENT LAMPS!

Effective September 1, 1942

NEW LOW PRICES ON G-E MAZDA F LAMPS

14-WATT T-12	was 80c	now 70c
15-WATT T-8	was 65c	now 57c
15-WATT T-12	was 80c	now 70c
20-WATT T-12	was 80c	now 70c
30 WATT T-8	was 80c	now 95c
40-WATT T-12	was $1.15	now $2.15
100-WATT T-17	was $2.60	now $2.15

Above prices refer to daylight and 3500° white. Prices also reduced on soft white and colored G-E MAZDA F lamps.

Also reduced! G-E MAZDA H (Mercury) LAMPS

400-WATT T-16 AH1	was $11.00	now $9.50
400-WATT T-16 BH1	was $11.00	now $9.50
3000-WATT T-9½ AH9	was $45.00	now $40.00

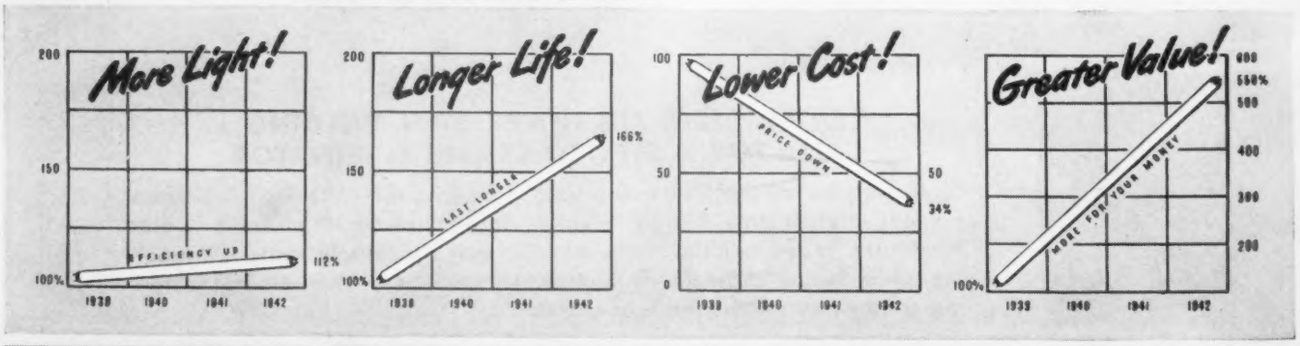
THE SEVENTH REDUCTION IN FOUR YEARS!

NO price reduction, of the many we have been able to make, gave us in General Electric as much genuine satisfaction as this one—made possible at a time when light is being called upon to play a major role in wartime production.

Made in the face of rising cost trends, this reduction is the result of manufacturing economies and technical developments, combined with vastly increased use. It is made in accordance with G-E's policy of passing such savings along to customers.

But lower prices are only half the story. Not only have we been able to reduce prices, we have steadily improved these lamps. They give more light! They last longer! They *stay brighter longer!*

For instance, purchasers of the widely used 40-watt white G-E MAZDA F lamp now pay only 95c instead of the $2.80 they paid in 1939. But we are prouder that this lamp lasts 66% longer and is nearly 12% brighter . . . that it gives you 5½ times more value for your lamp dollar than it did in 1939! (See charts below.)

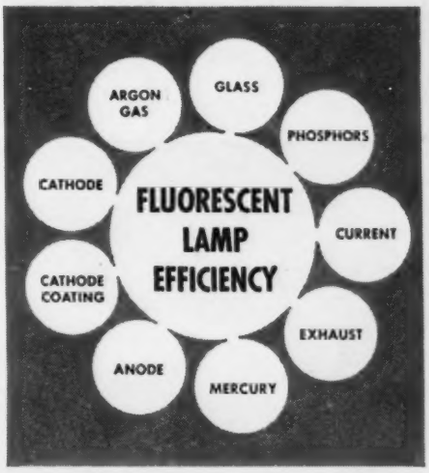


G-E MAZDA LAMPS
MADE TO STAY BRIGHTER LONGER

GENERAL

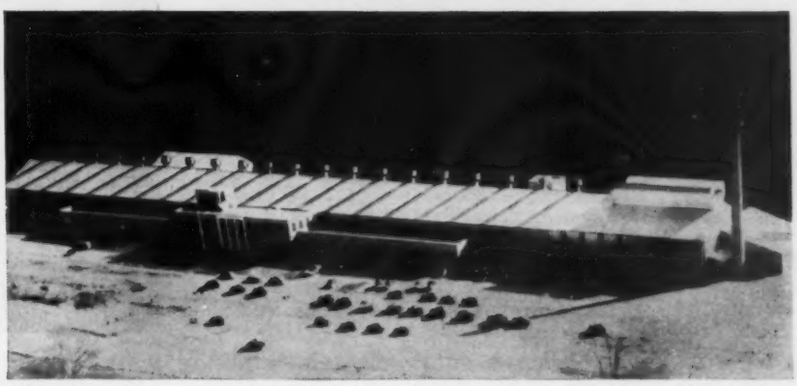
The Story Behind MORE LIGHT *for* LESS COST

G-E research constantly seeks the best possible combination of all factors affecting lamp efficiency. Here are nine of the most important. There are more than a million possible combinations of these factors. It's the task of G-E research to find the *best* possible combination!

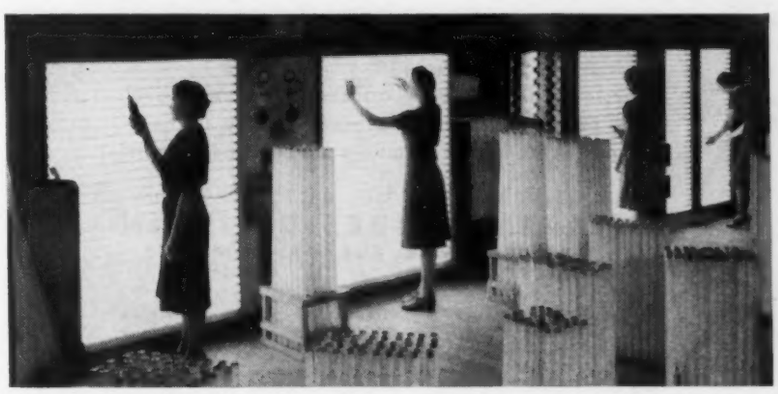


All materials are tested with extreme care. Here, we check the brightness of phosphor powders that coat the inside of fluorescent lamps to make sure that you get maximum performance from your G-E MAZDA F lamps.

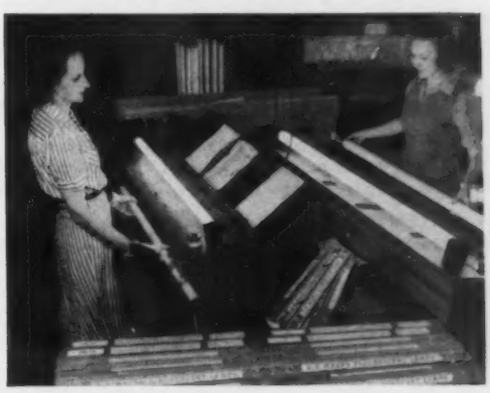
Experience counts. W. L. Enfield (left) and P. J. Pritchard have been active in directing research for better product and lower prices.



Here is one of the new streamlined, specially designed G-E fluorescent lamp factories that have helped materially in reducing costs. Sand for glass tubes comes in at one end. Finished lamps are shipped from the other.



Constant testing guards the quality of G-E MAZDA fluorescent lamps. At every stage in the manufacturing process, General Electric inspections provide safeguards of quality. Above, G-E MAZDA lamps are inspected while undergoing a "seasoning" process on the test racks.



Extra assurance of quality is a series of over 50 tests and checks on completed lamps by MAZDA SERVICE inspectors, who work under the direction of an independent testing laboratory.

GE ELECTRIC

Helpful Hints FOR FABRICATING STAINLESS STEEL TUBING

Stainless steel tubing *is workable.* It may be successfully fabricated by practically all the standard methods. Especially is this true of ELECTRUNITE Stainless Steel Tubing—with its consistent uniformity of diameter, wall thickness, concentricity, strength, and ductility made possible by electric resistance welding.

In fabricating stainless steel tubing, some allowance must be made for differences in metallurgical and physical properties as compared to carbon steels, with fabricating procedures adjusted accordingly. The general hints following will indicate most important points.

BENDING—Welded stainless steel tubing can be bent to the same radii as carbon steel. Bends can be made by press or over an inside mandrel—or, for small quantity production, by filling the tube with sand, rosin, lead or a low-melting-point alloy. A mixture of 50% lithopone and 50% water-free soluble oil is recommended as a lubricant.

EXPANDING—Welded stainless steel tubing can be expanded, Van Stoned or flanged at room temperature. When preheating is necessary, the tubing should be reannealed as follows:

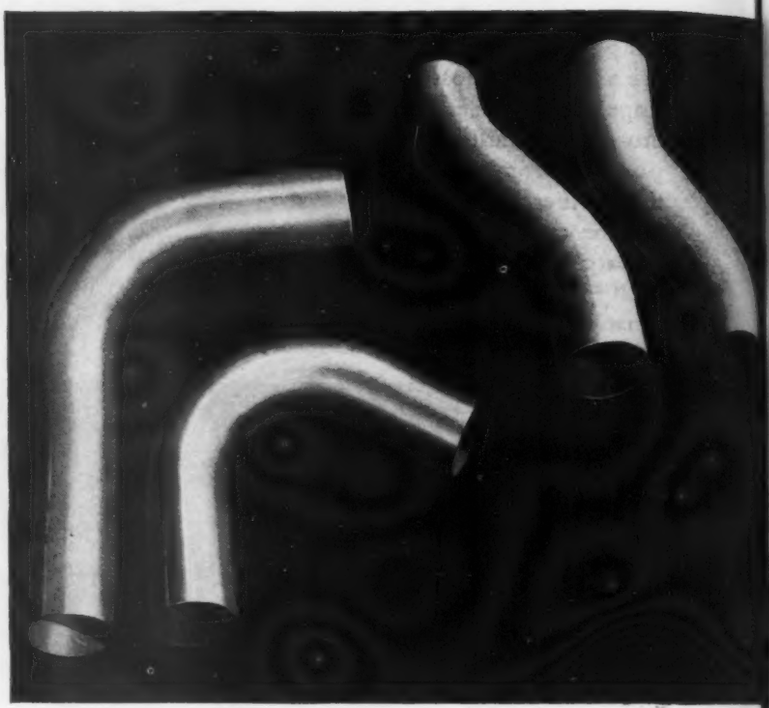
Types 302, 304, 321 and 347 . . .
. . . 1800—2100° F. and water quench.

Types 309S, 316 and 317 . . .
. . . 1900—2100° F. and water quench.

MACHINING—Cutting tools should have greater rake than for carbon steels, and speeds should be reduced. Special cutting oils for stainless steels are recommended for drilling and turning operations. By adding sulphur to a good grade of cutting oil until the chips no longer weld to the tool, results may be improved. If the tool wears too rapidly, dilute the mixture with additional lubricant.

WELDING—In oxy-acetylene welding, a bare rod of the same analysis as the tube should be used without flux (except on heavy welds). Use a small, neutral flame and avoid puddling or the formation of craters. Arc welding should be done with a coated electrode, following the technique recommended by electrode manufacturers.

SOLDERING—If soft solder is used, soldering iron used should be larger than that used for carbon steel. Since silver soldering usually is performed with a small torch, it should be remembered that the "18-8" alloys are subject to inter-granular corrosion in the temperature range of 800 to 1500° F. All excess flux acid must be removed after soldering or brazing.



These are general hints—and specific recommendations for each type of work may vary slightly in each individual case. Steel and Tubes' engineers will be glad to offer detailed information pertaining to your particular type of work. In addition, you will find much of interest in the booklet, "The Fabrication of Republic Enduro* Stainless Steel"—the material from which ELECTRUNITE Stainless Steel Tubing is made. We shall be glad to have a copy sent to you.

STEEL AND TUBES DIVISION
REPUBLIC STEEL CORPORATION
CLEVELAND • OHIO

Berger Manufacturing Division
Culvert Division • Niles Steel Products Division
Union Drawn Steel Division • Truscon Steel Company
Export Department: Chrysler Building, New York, New York

*Reg. U. S. Pat. Off.

Republic

ELECTRUNITE

Reg. U. S. Pat. Off.

ELECTRIC RESISTANCE WELDED STAINLESS STEEL TUBING

Also Boiler Tubes • • • Condenser and Heat Exchanger Tubes • • • Mechanical Tubing

This Dust Hood
is doing "a job that couldn't be done"

● The dust nuisance resulting from the shaking out of dry sand molds was so severe in this foundry, that the operator of the overhead crane, who was of necessity directly over the shakeout, had to use a gas mask. It was impossible to see even 10 feet in any direction when a flask was being shaken out.

After other attempts to relieve the dust nuisance had failed, the management installed a Bartlett-Snow Side Wall Dust Hood (Des. 121704) 12′ long by 14′ high, having 24 pyramidal shaped openings which deliver upwards of 33,000 cubic feet of air per minute to the plenum chamber connected with an underground duct to a Bartlett-Snow Wet Type Dust Collector located outside the building.

So great is the dust collecting capacity of this equipment—see illustration above—that it is now possible to shake out flasks 7′ long, 3′ wide, and 3′ high on the most distant edges of the shakeout without any visible dust loss whatever,—and even to handle flasks 17′ long, 5′ wide and 3′ high, with only slight traces of dust loss, even though these masks are 7′ longer than the shakeout itself.

Our recently issued 40-page Foundry Bulletin No. 91 describes Bartlett-Snow Dust Collecting and other Foundry Equipment in detail, and contains much information of interest to every foundry manager and operating man. . . . Send for a copy today!

THE C. O. BARTLETT & SNOW COMPANY
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PRESIDENT

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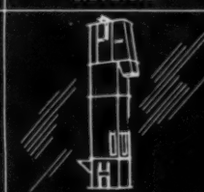
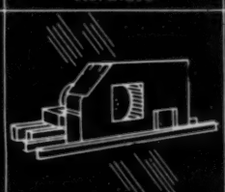
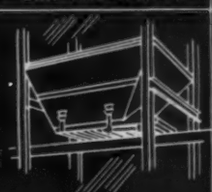
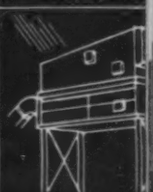
Complete Sand, Mold and Castings Handling Equipment for any requirement, including

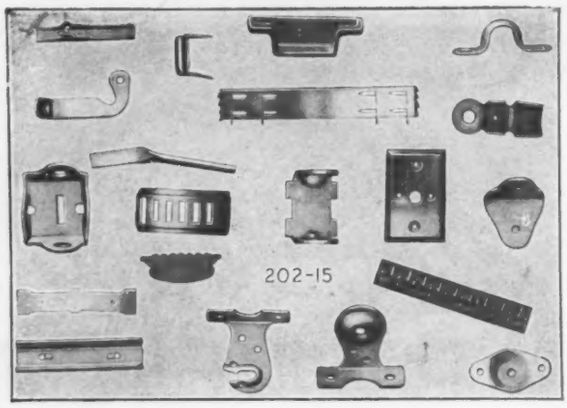
Shakeouts	Elevators	Aerators	Sand Distributors	Bins and Feeders	Apron Conveyors	Dust Collect
						

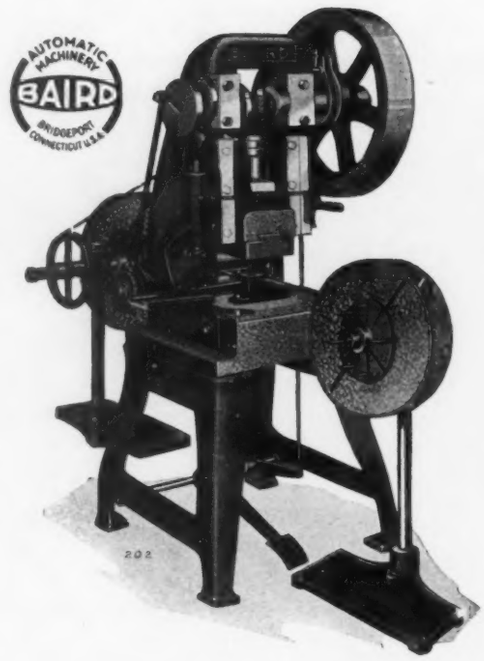
BAIRD AUTOMATIC PRESSES . . .

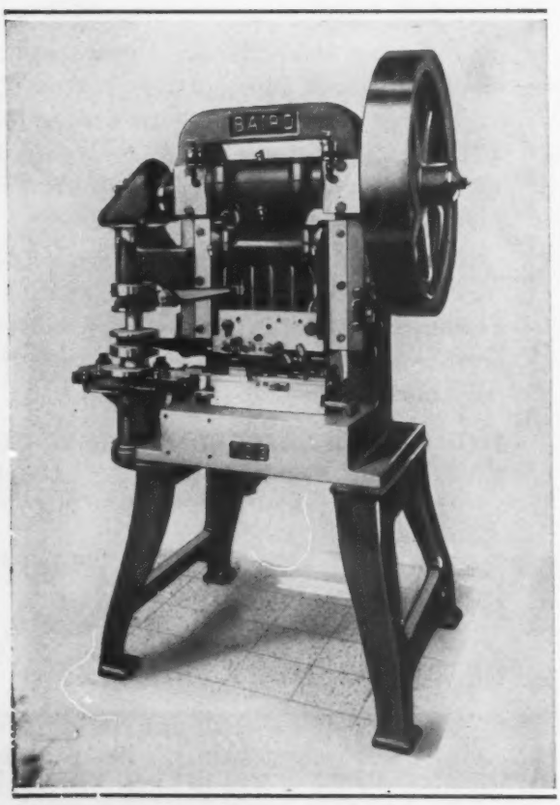
Herewith are shown two types of Baird Automatic Presses for large quantity production. The one to the right is a Standard Heavy Single Action Open Back Press with readily removable and readily attachable automatic attachments, in this instance a single station transfer.

Many manufacturers using automatic machines elsewhere in the shop are overlooking the benefits of the automatic principle in their press departments. For constructive suggestions leading toward betterment of press production we invite such manufacturers to

"Ask BAIRD About It"







AUTOMATIC MULTIPLE TRANSFER PRESSES

The latest of the many Baird achievements is the Automatic Multiple Transfer Press for the automatic production of articles from the coiled material.

Transfer fingers not only transfer the blank to various stations, but they also retain their grip until the punches make contact.

Machines have been arranged with different types of feeding mechanism, strokes for slide, stroke for transfer to best suit the article to be made.

All punches have independent adjustments. The punches, dies, transfer slide and fingers constitute a unit which may be removed from the press *in a very few minutes.* This important feature eliminates time-consuming tool set-ups when changing over from one job to the next.

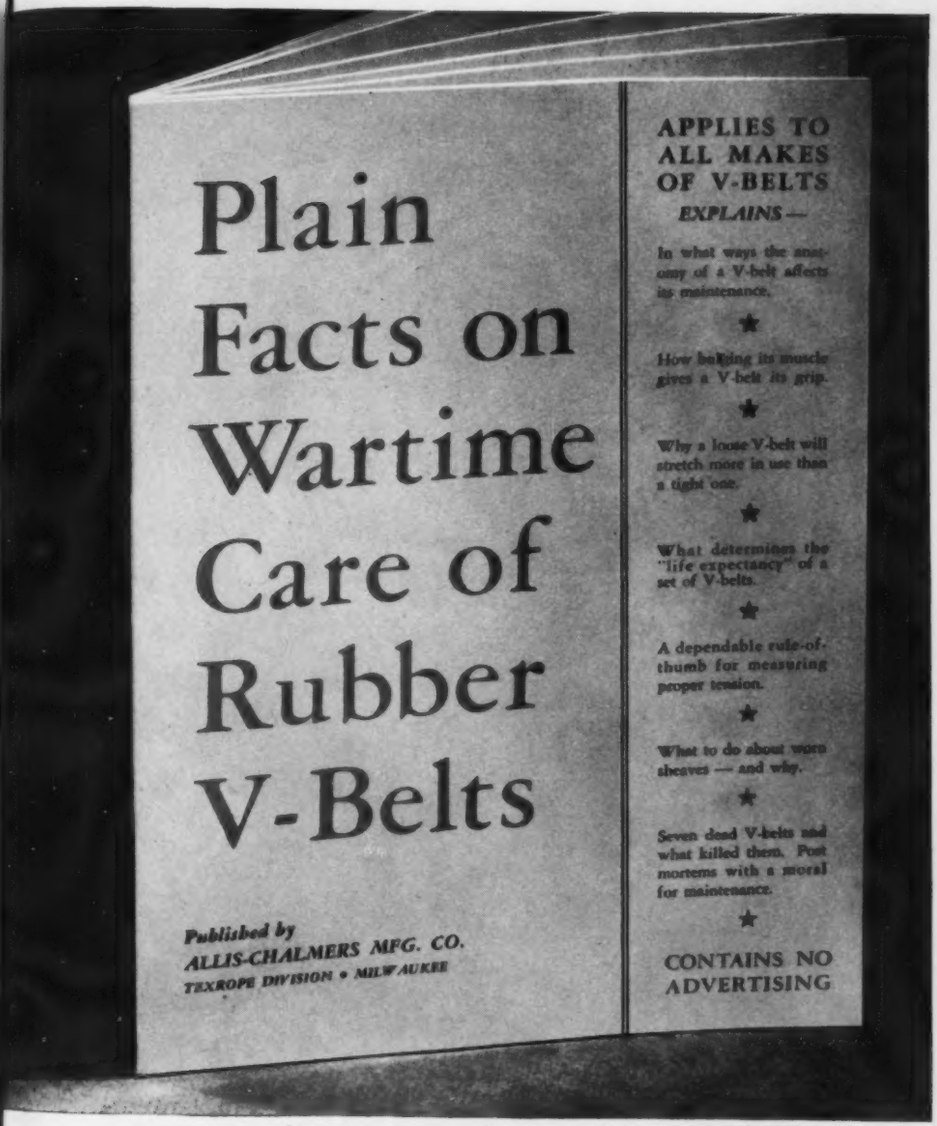
Over 60 years of Baird engineering skill and experience are embodied in this new Automatic Multiple Transfer Press which is built in six sizes to take strips 1½" to 6" in width. Get the full details of this new development.

"Ask BAIRD About It"

THE BAIRD MACHINE COMPANY
BRIDGEPORT, CONN.

ANNOUNCING ALLIS-CHALMERS' NEW

Wartime Guide to V-belt Care!


Plain Facts on Wartime Care of Rubber V-Belts
Published by ALLIS-CHALMERS MFG. CO. TEXROPE DIVISION • MILWAUKEE
APPLIES TO ALL MAKES OF V-BELTS
EXPLAINS—
In what ways the anatomy of a V-belt affects its maintenance.
How bulging its muscle gives a V-belt its grip.
Why a loose V-belt will stretch more in use than a tight one.
What determines the "life expectancy" of a set of V-belts.
A dependable rule-of-thumb for measuring proper tension.
What to do about worn sheaves — and why.
Seven dead V-belts and what killed them. Post mortems with a moral for maintenance.
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*Trade mark registered U. S. Patent Office. Texrope Super-7 V-Belts are the result of the cooperative research and design genius of two great companies — Allis-Chalmers and B. F. Goodrich — and are sold exclusively by Allis-Chalmers. Available in all sizes..... ½ h.p. to 2,000 h.p.

±.0005"? OK Mister, you came to the right place!

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"Techni" PROCESS ALLOY IRON ROLLS

. . . they are non-spalling

. . . give improved surface finish

. . . have soft and strong necks and wabblers

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They Roll More Tons Per Roll Grind

Mackintosh-Hemphill Nironite rolls are high nickel alloy iron, of the grain or indefinite chill type. The body surface structure very closely approaches that of the true chill rolls. Body centers and necks are soft and strong.

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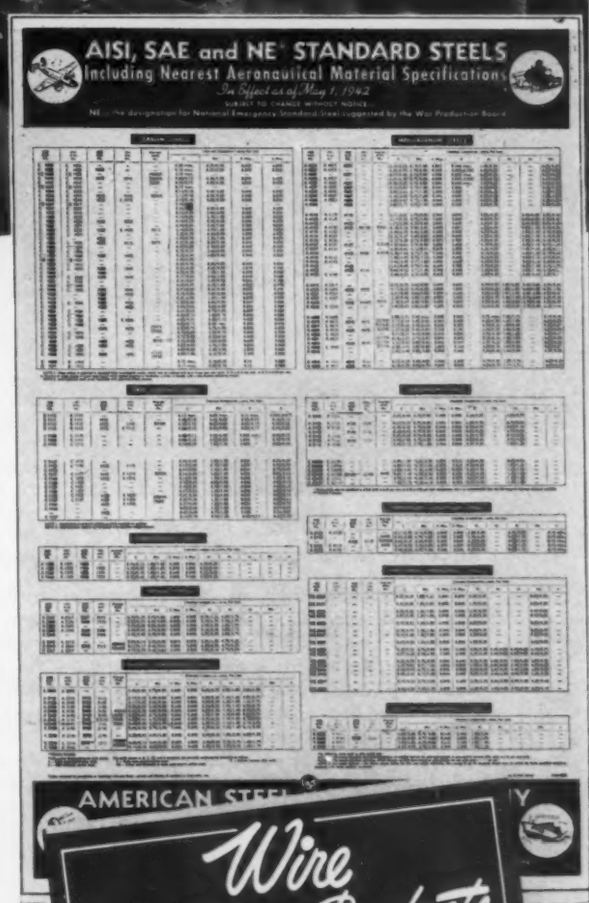
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In Effect as of May 1, 1942
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A WEALTH OF HARD-EARNED EXPERIENCE

NO one can deny the farsightedness of the WPB in fostering the development of the National Emergency Steels as alternates for steels of higher strategic alloy content.

These new, low alloy steels cover a wide range of properties. Many of them are actually outperforming the steels previously used. If you really want to help Uncle Sam stretch the supply of critical nickel and chromium, you'll put them into production without delay. To help you adapt them to your special needs with the minimum interruption of your established procedure, the services of our experts are freely offered.

Where your fabrication methods must be altered or heat treatments changed, or both, these specialists in steel and wire are prepared to show you how it can be done. And in the difficult and necessary task of choosing the right alternate steels to cover your requirements, their advice will save you time and trouble. We invite you to make use of their experience in furthering the common cause of Victory.

Get this FREE Chart!

It lists the National Emergency Steels (Series NE 8000) and other steels such as Series AISI-A4000, specially recommended for war production purposes. Use it as a practical and handy guide whenever necessary. For your copy write on your Company letterhead to American Steel & Wire Company, 408 Rockefeller Building, Cleveland.

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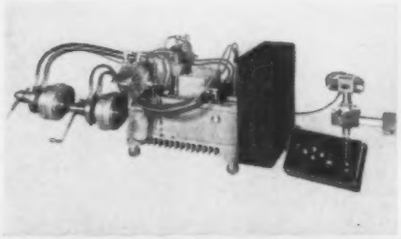
UNITED STATES STEEL

How to Get
MASS PRODUCTION
from TOOL ROOM TOOLS

High Speed Production at Tool Room Limits Without Specially Built Machinery

Many of the nation's foremost manufacturers have been faced with the novel necessity of producing ordnance on a combination precision-mass production basis with tool room tools. Limits of accuracy previously never expected outside the tool room have been required. This, together with the necessity of using relatively unskilled help, presented an almost impossible problem.

To make ordinary tool room machine tools and "green" help



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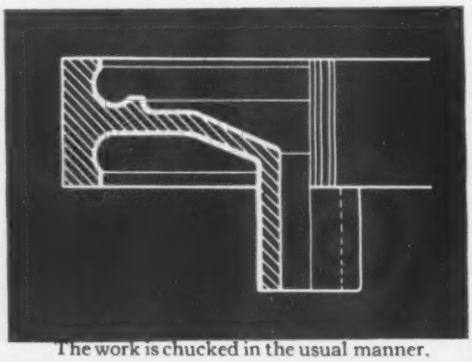
"do the impossible", however, has become an accomplished fact.

Separate machine tool controls have placed many of the operations on a full automatic basis; the most skilled of their operators have been released for work of greater importance. The elimination of the necessity for increased floor space and excessive long waiting for specially built equipment has been entirely obviated. These machine tool controls, DUPLIMATICS, manufactured by the Detroit Universal Duplicator Company, are now being used throughout the country on war goods production exclusively. The type of work that can be handled is described as follows.

AUTOMATIC CONTOUR TURNING

This sketch shows a thin section propeller gear housing which was of too intricate contour to be machined by manual operation, too thin to be done with forming tools. Also, too few a number were required too fast to permit the designing and building of equipment for this one operation alone.

A "DUAL" DUPLIMATIC was connected with the cross and longitudinal feeds of a standard Reed-Prentice lathe. Both feed screws are turned automatically and simultaneously as required to feed the cutting tool in and out.



The work is chucked in the usual manner. A template of the exact size and outline of the finished work is fastened to the cross feed carriage. A tracer, clamped to the lathe bed, is adjusted so that its stylus can contact the template. The moment the operator starts the lathe and touches the starting button on the control panel of the DUPLIMATIC, the latter "takes over" entirely on a full automatic basis—moving the cutting tool automatically along the exact path of the finished work.

Since the operation is entirely automatic and since the feed on both screws is simultaneous and graduated in extremely fine increments, blending of radii is certain and even the straight portions of the work is of such fine finish that very little hand-finishing is required. DUPLIMATICS have shown an increase of 7 times the production possible with manual control. Moreover, a decided decrease in hand-finishing and scrapped parts has resulted.

AUTOMATIC CONTOUR MILLING

Milling the contour of aircraft connecting rod cavities is now being done on standard vertical milling machines. In this instance, there was no waiting for special equipment, nor any special training required for the operators of the machines. This operation, while requiring the close-finish of tool room die sinking work, has to be done at speeds impossible with manual operation alone.

The "DUAL" DUPLIMATIC, identical with that used for the contour turning mentioned above, turns the longitudinal and cross feed of the milling machine table. (If the depth of cut also had a contour or variation, a "THREE-WAY" DUPLIMATIC instead of the "DUAL" DUPLIMATIC would have been required.) A template is mounted on the table alongside so that it can be contacted by the stylus of the tracer.

This operation is also automatic, excepting that the operator is required to touch one of four "change-of-direction" buttons on a handy control panel when the milling operation is negotiating a corner of the work. Exceptional blending of radii has resulted in reduction of hand-finishing as compared with that required before the "DUAL" DUPLIMATICS were installed.

The DUPLIMATIC equipment used in this work is an entirely separate control mechanism which can be used with almost any machine tool. The advantages of the use of DUPLIMATICS are that no specially built equipment is needed; tool room tools can continue to hold the accuracies for which they were originally designed.

Specially trained operators are not needed. Usually the same operator, with a few hours' instruction, carries on. In some instances, relatively unskilled operators have replaced the old operators—the latter being released to do work requiring their particular skills.

The installation of DUPLIMATIC on a machine tool does not limit that machine to automatic duplicating only. The DUPLIMATIC can be quickly "de-clutched" from the feeds to permit manual operation.

DUPLIMATIC machine tool controls are used in some of the largest mass production shops in America, producing: TORPEDOES—BOMBS—MACHINE GUNS—AIRPLANE ENGINE PARTS—TANK TURRETS—ANTI-AIRCRAFT GUNS—AIRPLANE LANDING WHEELS.

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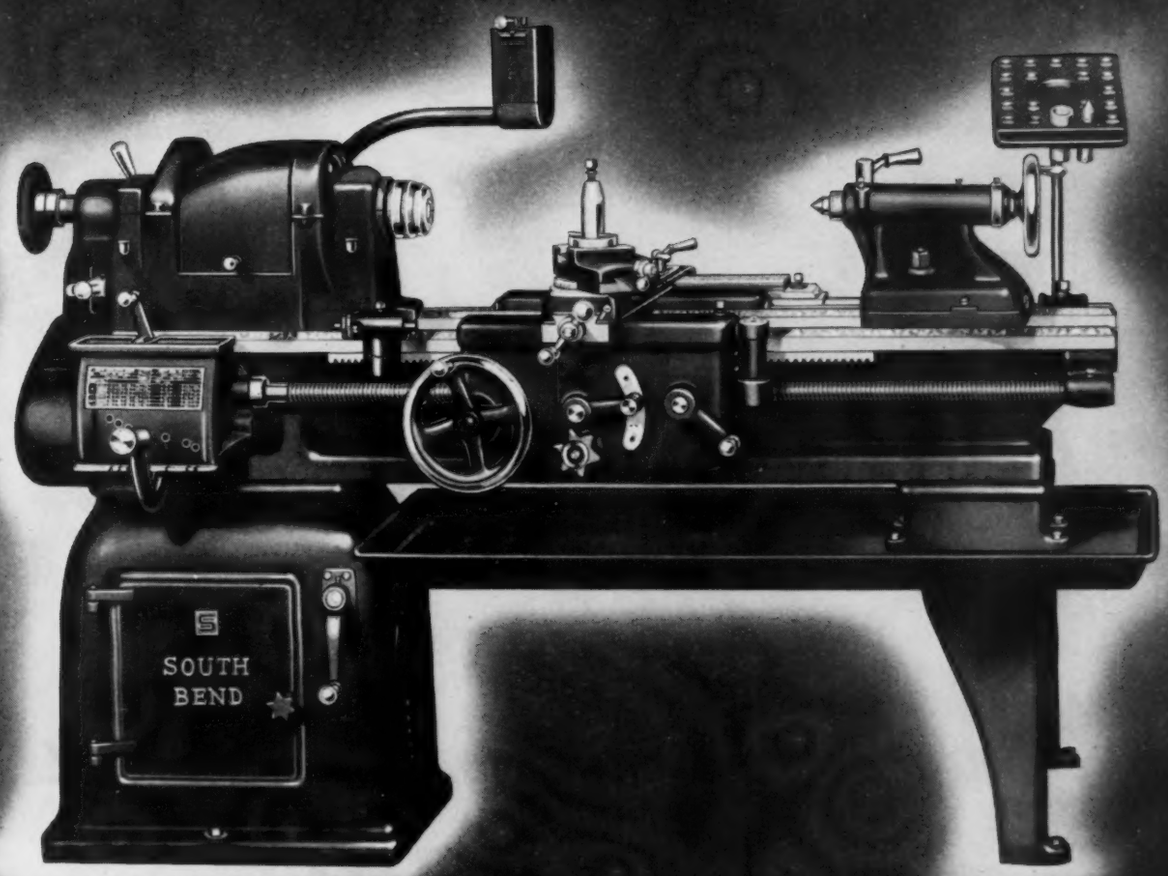

VERSATILITY which permits quick change-over from one job to another, with little inconvenience or loss of time, is a real speed-up factor in tooling a new job. Such versatility—the reduction of set-up time to a minimum—enables you to get into production quickly. It is one of the advantages in selecting South Bend Lathes for urgent defense contract work calling for early deliveries.

Permanent accuracy is built into South Bend Lathes to assure uniform precision. Their wide range of spindle speeds permits machining work with maximum cutting tool efficiency. And not the least important—their convenient controls make for an ease of operation which reduces fatigue and lessens the possibility of error.

Ideal for the heavy production schedules which National Defense demands, South Bend Lathes come in five sizes—9″, 10″, 13″, 14½″ and 16″ swing—all sizes supplied with toolroom or manufacturing equipment. Write for catalog and name of nearest dealer.

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has gone to War

for Victory

Great Lakes Steel is proud of the part N-A-X Series 9100 is playing in our Victory program. For this *versatile* steel is doing double duty for war. First, it is being used to build the finest fighting equipment in the world. And second, *it is conserving critical alloying elements*, for in N-A-X 9100 Series, all strategic elements are held to an absolute minimum.

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ROLLING MILL MACHINERY
for the iron, steel and
non-ferrous industries

After all, it's the machine operator who must use the equipment. That's why conferences like this, around the drawing board, are common practice in the **HECKER** organization. Win the operator's approval of a tool design and you've gone a long way toward assuring top quality, high-speed production.

HECKER tool engineers are always in intimate contact with production men and machines. Many of their designs go to work right here in our own plant. You see, in addition to being designers and builders of tools, jigs and fixtures, **HECKER** also fabricates precision parts for the country's leading airplane manufacturers.

HECKER tools, jigs and fixtures will do for you what they're doing for us—help you keep abreast of heavy wartime schedules. **HECKER** will design a single jig or lay out an entire tooling job for you. For this help, write to A. W. Hecker, 1980 East 66th St., Cleveland, O.

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THE WILL TO WIN

(as spontaneously expressed by a Cushman employee)

Some time ago when the enemy struck
"Right into high" went Cushman Chuck
Machines were pushed . . . with the dedication
"MAKE MORE CHUCKS to protect the nation".

We'll make the chucks for many a lathe
To turn the enemy into his grave
To build a gun . . . and finish a plane
And drive the Axis back again.

Some of the boys have gone to war
To fight for the things worth fighting for
So it's up to us to help this crew
That worked at a bench with me and you.

The more we produce and the more we give
Will make more certain our pals will live
They'll be thinking of us in foreign lands
With thanks for a chuck and for what it stands.

They know what it means as a tool of war
They know from the battle just what it's for
That without a gun there'd be no pluck
And THERE'D BE NO GUN without a chuck.

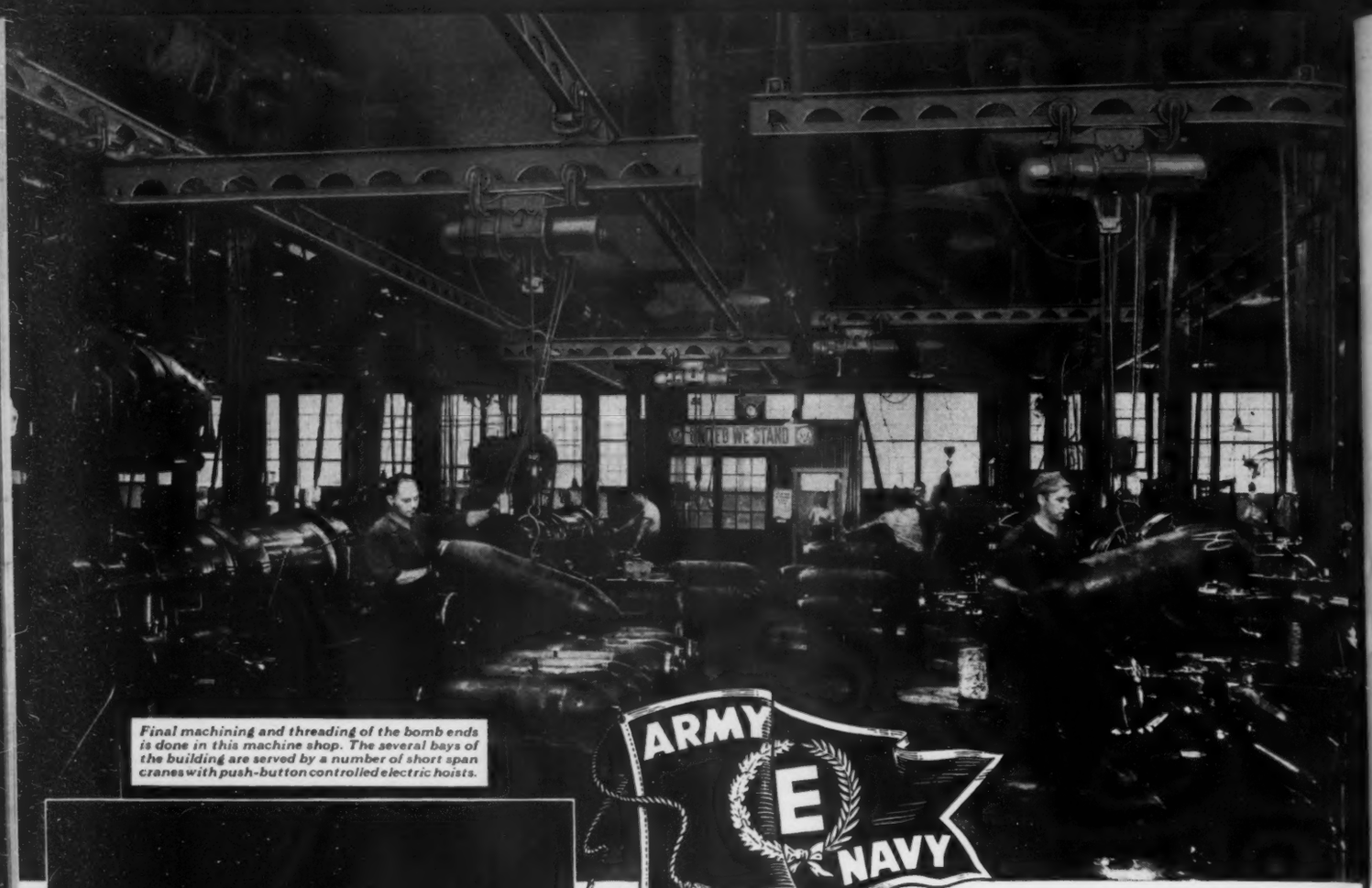
So all of us here at Cushman's work
Will boost production . . . never shirk
With a steady stream of chucks for the nation
. . . America . . . Cushman . . . cooperation.

Eugene Pilkington

WORLD STANDARDS FOR PRECISION

CUSHMAN

THE CUSHMAN CHUCK CO. CHUCKING ENGINEERS SINCE 1862 HARTFORD, CONN.



Final machining and threading of the bomb ends is done in this machine shop. The several bays of the building are served by a number of short span cranes with push-button controlled electric hoists.

The hot semi-drawn bombs are taken from the reheat furnaces by the overhead Tramrail system to the draw bench for further drawing.

ARMY-NAVY "E" WINNER SPEEDS BOMB PRODUCTION with CLEVELAND TRAMRAIL

CLEVELAND TRAMRAIL is especially proud of the part it is playing in the production of large demolition bombs, in the plant of a large Pennsylvania steel company, because this concern recently was awarded the coveted Army-Navy "E" for its meritorious work. Every delivery promise made on the many contracts this plant has completed, has been beaten by a wide margin.

As Cleveland Tramrail is used in every department from the beginning to the completion of the bombs, it is of paramount importance that this equipment keep operating smoothly at all times, seven days a week, 24 hours a day. Since installed in 1940, when the plant was converted for bomb manufacture, the Cleveland Tramrail equipment has so performed.

The work is hot, hard and dirty, necessitating equipment that is built to withstand the most rigorous of operating conditions. Cleveland Tramrail cranes of various types are used, some have all motions motorized; others are hand-propelled with only the hoists being motor-driven. Considerable overhead rail is employed for delivering the hot bombs by use of easy rolling carriers from the furnaces to draw benches, forging hammers, sand blasting machines, and other operations.

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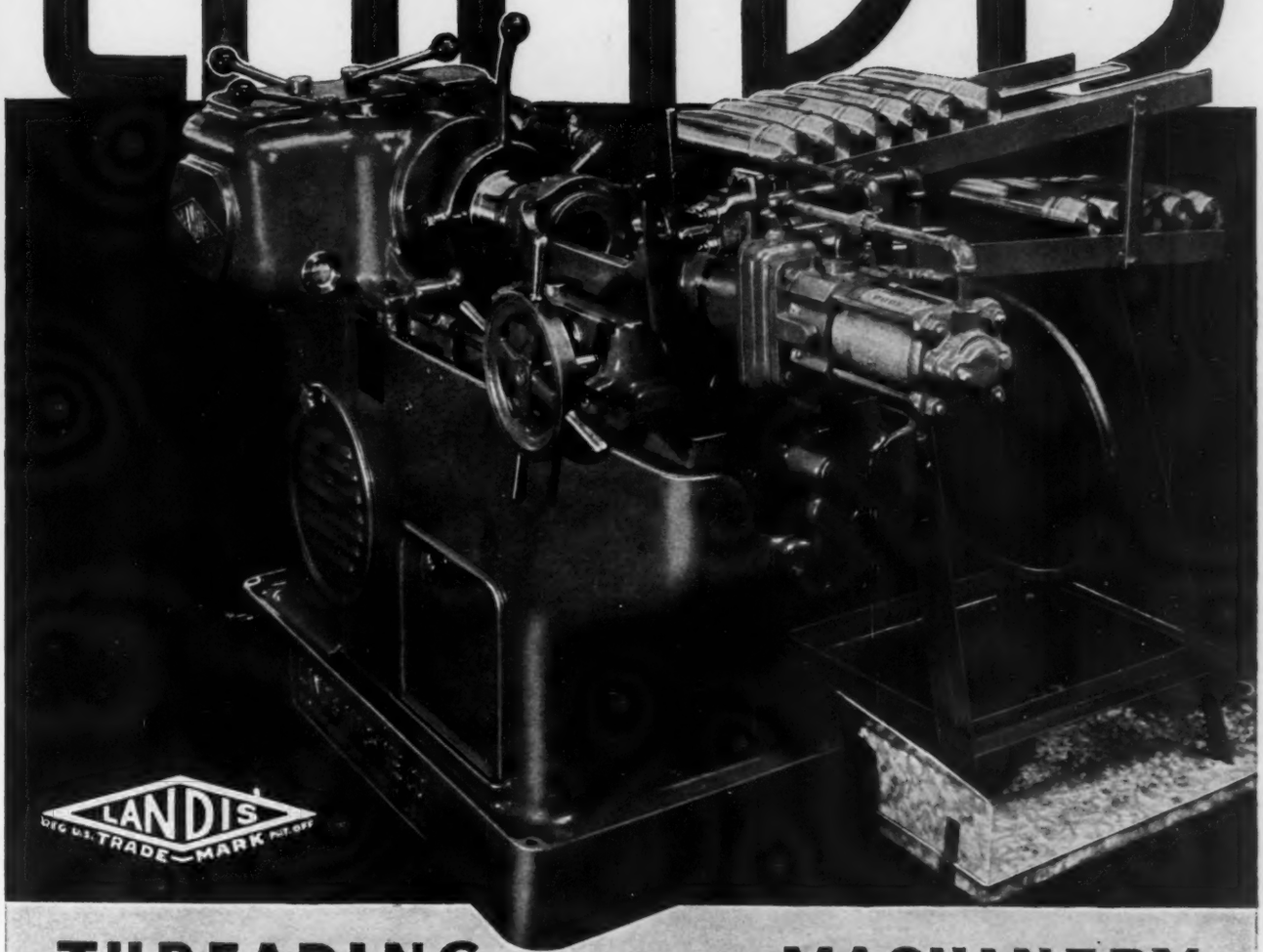

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"...For high achievement in the production of war equipment..."

Presented with the Army-Navy Production Award, the Gleason Works accepts these words as an honor and a challenge.

The job well-started must be finished.

To better the ever-increasing rate of production—to maintain the Gleason standards of quality—to speed the Victory which must be ours—these are our goals. We will achieve them.

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Builders of Bevel Gear Machinery for Over Seventy-five Years

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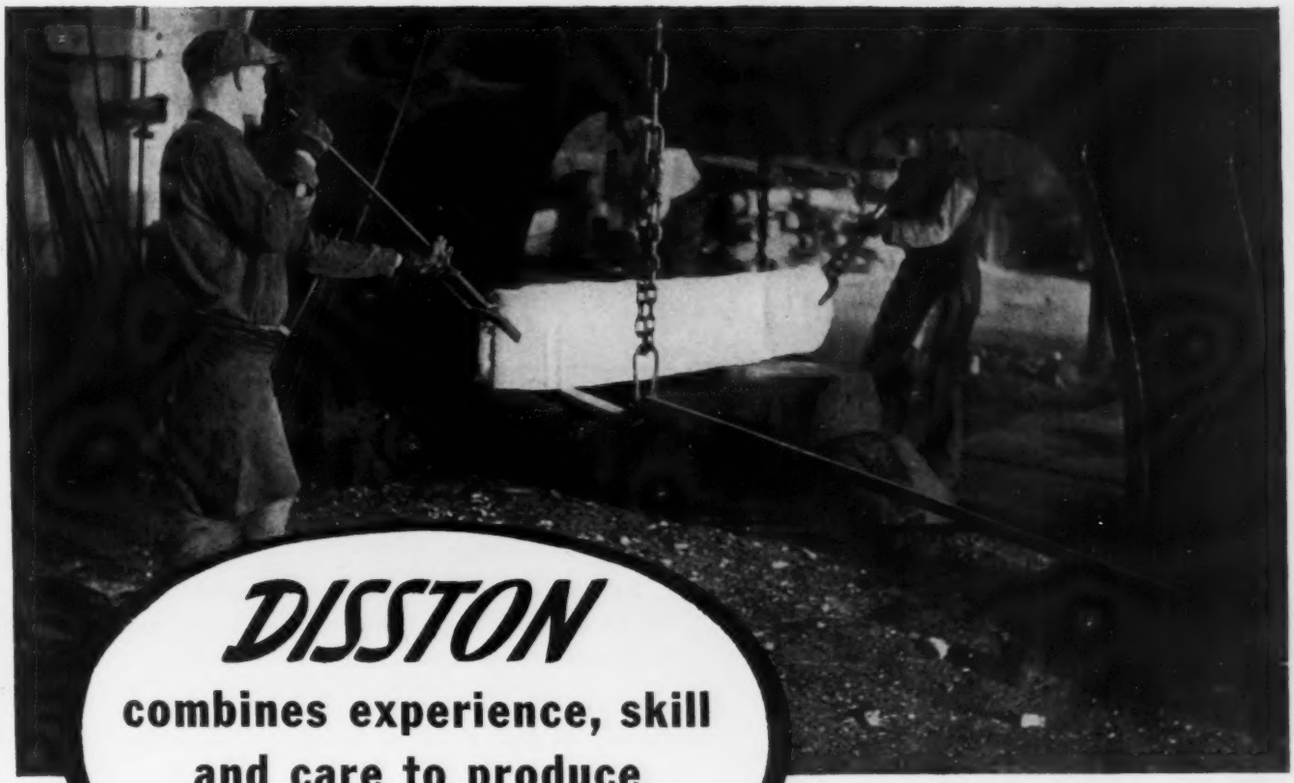

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combines experience, skill and care to produce BETTER TOOL STEELS

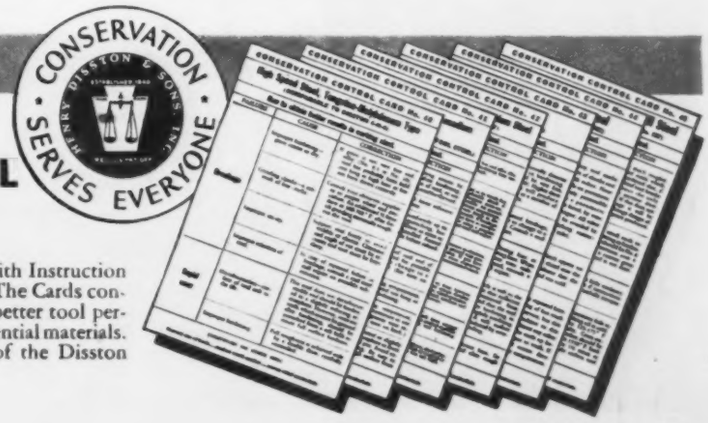
The art and science of making fine tool steels have been practiced in the Disston plant for 87 years—since Henry Disston pioneered with the first crucible saw steel ever made in America.

Quality has always been the first consideration. Today, skilled specialists, trained in the Disston tradition, produce high grade tool steels by the most modern methods. Painstaking selection of materials; accurately controlled melting practice in electric furnaces; careful, expert supervision of every step in the finishing processes—these achieve the *quality* that distinguishes Disston Steels.

Under precise metallurgical and chemical control Disston can produce, within close limits, desirable alloys of seven or eight elements. Inherent and apparent grain size can be predetermined. Soundness and cleanliness can be maintained at exceptionally high levels.

One of the high grade Disston Tool Steels of special note is MANSIL—a deep-hardening, non-deforming, uniform manganese-chromium-tungsten alloy steel with excellent machinability. Use Mansil for intricate tools and wherever varied cross sections must be deeply hardened.

Experienced help for tool-makers: Disston metallurgical engineers will be glad to help you select tool steels for best performance and longest tool life . . . If you have not received your *free* copy of the illustrated 73-page book, "Disston Tool Steels," write today to Henry Disston & Sons, Inc., 919 Tacony, Philadelphia, Pa., U. S. A.



DISSTON CONSERVATION CONTROL INSTRUCTION CARDS

At your request, Disston will supply you with Instruction Cards on six different types of Tool Steels. The Cards contain valuable information to help you get better tool performance, reduce breakage, and conserve essential materials. They are supplied *without charge* as part of the Disston Conservation Control Plan.

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Every reader of this publication knows of the nation-wide salvage campaign now in progress. But perhaps you have not fully realized its seriousness or its size.
In iron and steel alone, our immediate military needs require 6,000,000 tons of scrap over and above the regularly available supply.
You as an individual have an active interest and a vital part in the success of this drive. Each reader has this double obligation:
1. As a private citizen, he must scour his home from basement to attic, from front entrance to back fence, to round-up and contribute every pound of useless metal.
2. As a business man or employee, he must exert all his influence to see that his company or employer contributes everything possible to the campaign.
The scrap is rolling in. But NOT ENOUGH. Six million tons of extra steel scrap are not to be found on the front doorsteps of America.
To do your part to keep munitions going to the fighting fronts, contribute ALL the scrap you can muster.
THE YOUNGSTOWN SHEET AND TUBE COMPANY
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YOUNGSTOWN
SERVICE

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From One Ton of Your Idle Scrap

When you dig up scrap and send it to the furnaces you do more than *add* to America's steel supply. You *multiply* it. In the electric or open hearth furnace each ton of scrap is doubled by mixing with it an equal amount of pig iron. Scrap still is the secret of quickness and quality in steel-making. To speed the day of victory, search your plant again and again for over-age machines and tools, stock and repair parts that will not be needed during the war effort. Let them go double by letting them go to the furnaces. Redoubles their effectiveness by doing it now.

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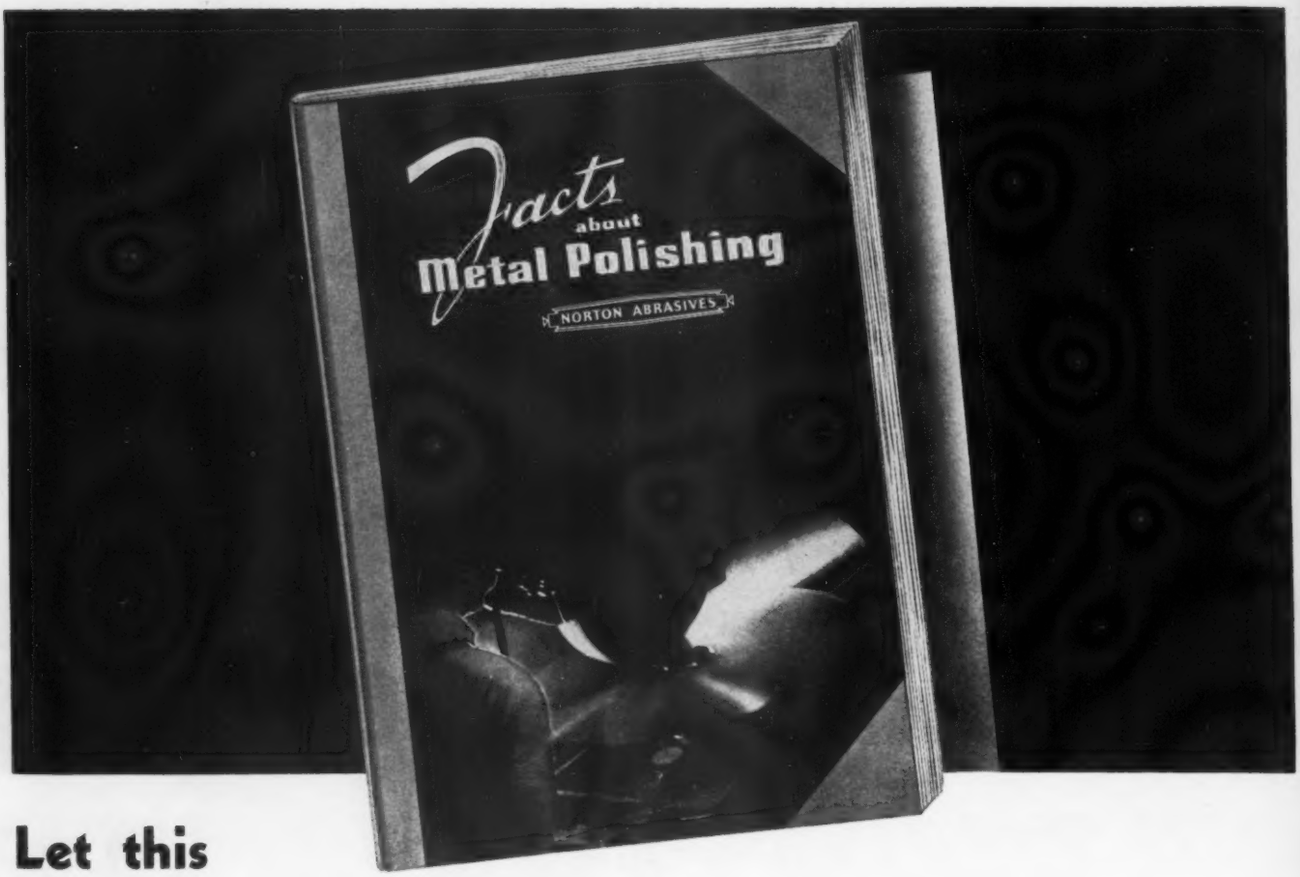

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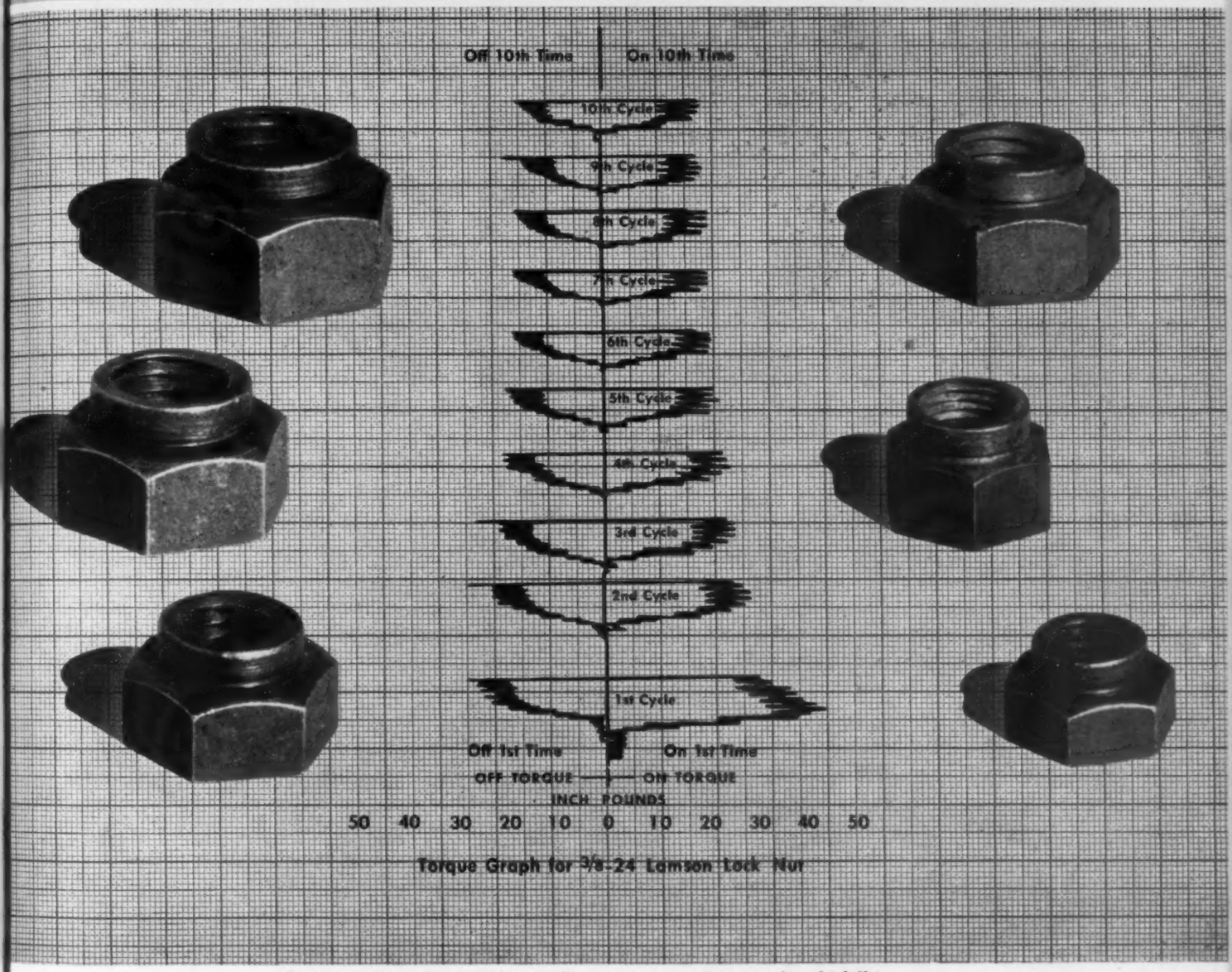
*U.S. PATENT NO. 2255286

Performance



ABOVE—each cycle of "on" or "off" represents a minimum of *eight full turns*

● It is one thing to make an unsupported claim and quite another to back it up—so let's look at a graphic illustration of the performance of Lamson Lock Nuts* after we have made these claims. We say the Lamson Lock Nut* clamps onto the thread of a bolt and *stays right there* until removed with a wrench. It does this because after forming the nut complete with thread, it is then slightly deformed on opposite sides of the collar which surmounts or crowns the nut proper, but which is an *integral threaded* part of the nut itself. The Lamson Lock Nut* is heat treated to impart spring action to the collar. The spring tension of the collar of the nut clamps the nut on the bolt like a vise, until purposely removed with a wrench. Removing the Lamson Lock Nut* does not damage the threads of either bolt or nut, hence the nut can be used over again as shown by the above graph. In the most severe kinds of tests, in the laboratory and in the field, the Lamson Lock Nut* is making good. And now verify our claims by asking for samples for any tests you choose to make, under any conditions you think are fair—*to you.*

★ Unless otherwise specified Lamson Lock Nuts* are supplied treated with a non-seizing, rust resisting black finish.

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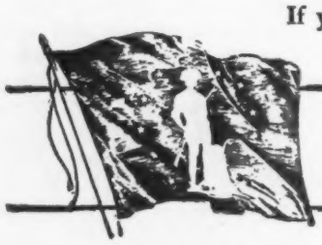

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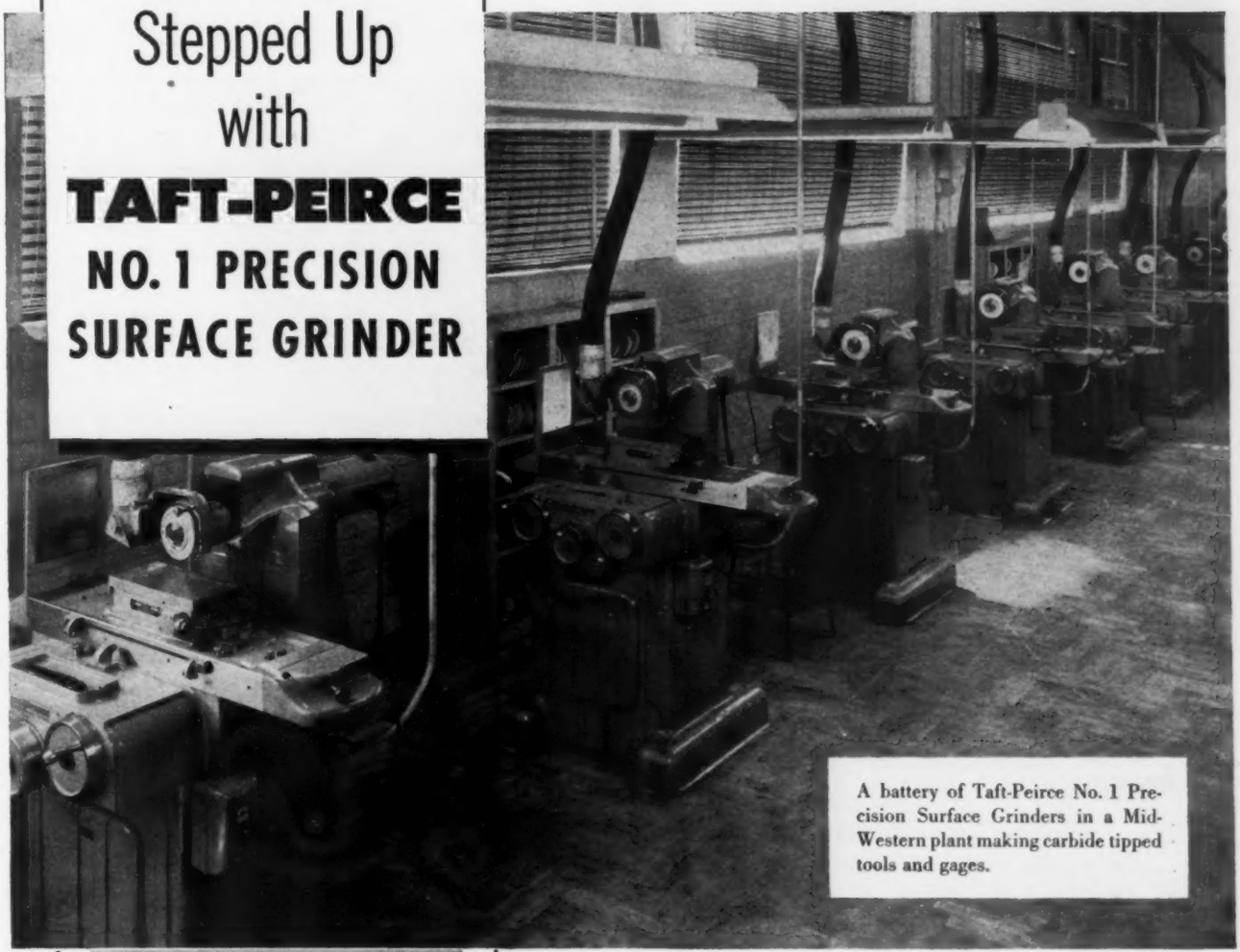
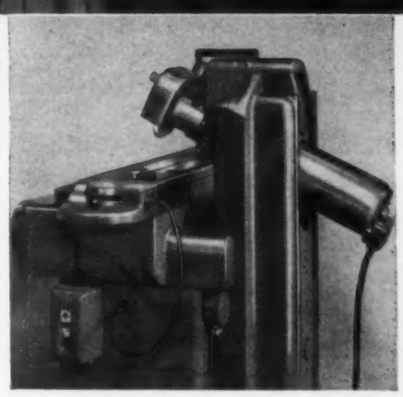


A battery of Taft-Peirce No. 1 Precision Surface Grinders in a Mid-Western plant making carbide tipped tools and gages.



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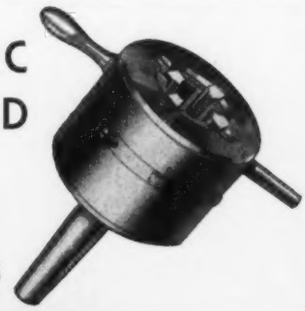

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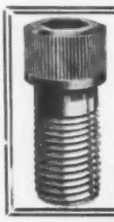

Fig. 1434 Pats. Pend'g

UNBRAKO

Fig. 232

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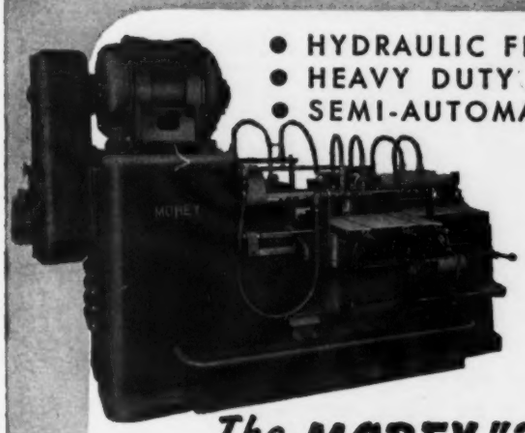

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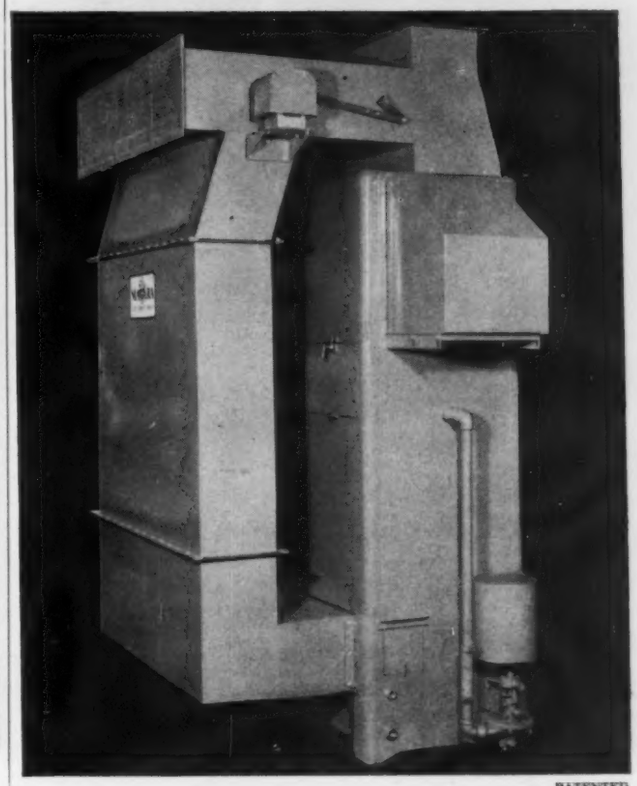

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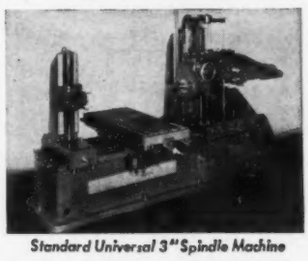

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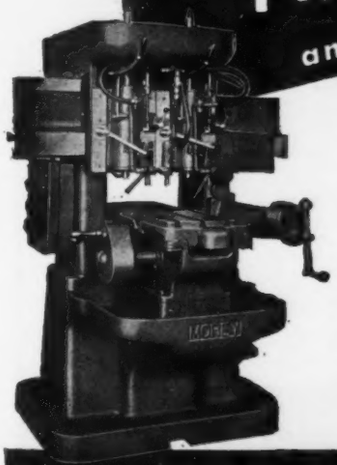

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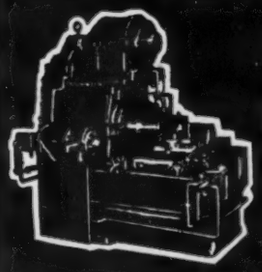

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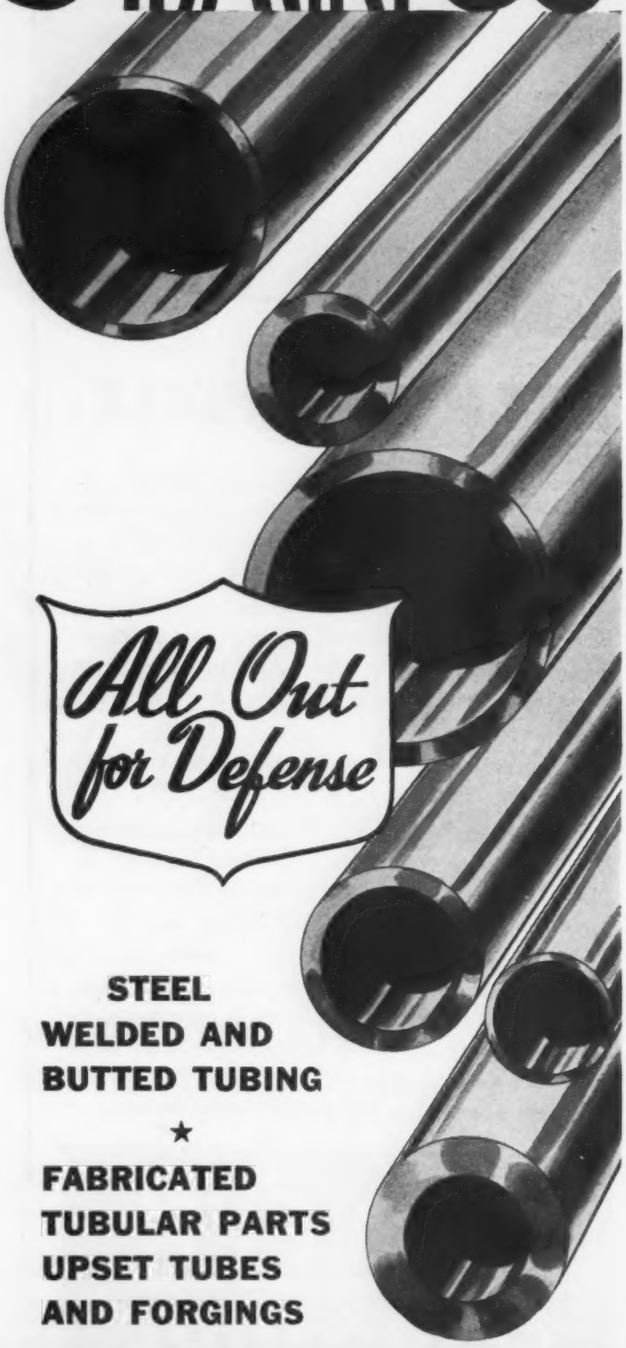

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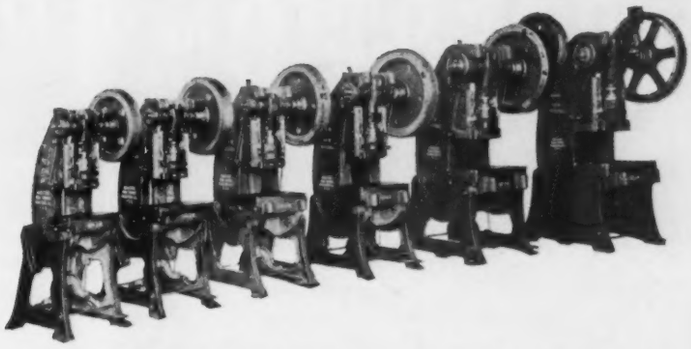

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Diameter of crankshaft at bearings and crankpin	1⅞-2¾"	2¼-3½"	2½-3¾"	3-4½"	3½-5¼"	4-5¼"	4-6"	4½-6¾"	5-7½"
Standard stroke of slide	2"	2"	2"	3"	3"	3"	3"	4"	4"
Maximum stroke of slide	4"	5"	6"	6"	7"	7"	8"	8"	10"
Area top of bolster, F to B by R to L	9½x16½"	12x19"	13x22"	14x26"	18x32"	18x32"	21x34"	24x41"	27x45"
Approximate weight Fly Wheel Press	1275	1890	2900	4500	7600	7700	9700	18500	24000
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Tons pressure (rated)	14	20	26	37	50	56	65	85	100

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Judd will produce military hardware in lots of thousands or millions to your specifications . . . *or to specifications developed out of collaboration between your engineers and ours.* In one recent case, for example, a Judd-recommended change from forging to stamping left the functional efficiency of the produced parts unchanged . . . but cut costs and *tripled* production speed.

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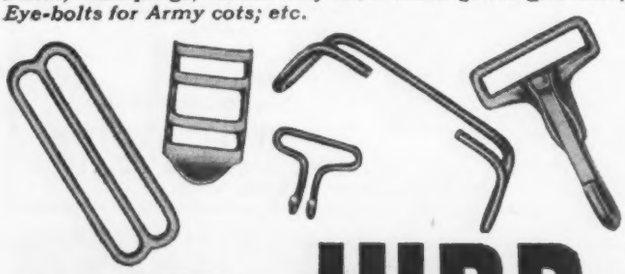
Rotating Bands, copper or gilding metal, for 20 Mm. shells; Bolts and Nuts for small arms cases; No. 4 Spur Grommets; Dee Rings; Snaps; Loops; Slides; Buckles; Double-End Hooks; End Tips; Wire Parts for Incendiary Bombs and Fuses; Stampings; Small Grey Iron Castings for grenades; Eye-bolts for Army cots; etc.



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Kindly send me your War Contract Bulletin.

Name.....

Address.....

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PLAIN MILLER
FOR SMALL PARTS PRODUCTION

WIDE RANGE OF SPINDLE SPEEDS from 75 to 1200 R.P.M.

TABLE SIZE 32" x 8'

QUICK DELIVERY BY LARGE SCALE PRODUCTION

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Philadelphia's Oldest, The Country's Largest Hot Dip Galvanizer. We have the most modern equipment to do first class galvanizing at lowest prices. Galvanized products furnished.

Galvanizing since 1867

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WIRE
STRIP, COILED
FOR FUSE ELEMENTS
EYELETS ALSO BRASS or STEEL

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Steel, Brass, Copper, Monel, Bronze, Aluminum, Zinc, Lead, Stainless Steel and all metals or materials punched as required and for all kinds of screens.

We can guarantee perfectly flat sheets free from buckles and camber.

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NO. 1 HEAVY DUTY GEARED HEAD HAND MILLER

Available with Longitudinal Power Feed to Table

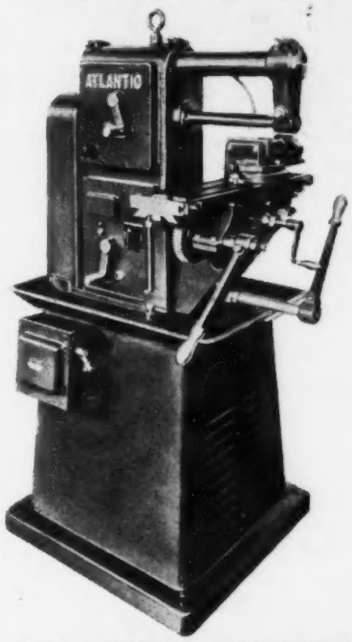

Table: 6"x24"
Capacity 5½"x8½"x18"

Geared Spindle Speeds —6 forward, 6 reverse. Optional spindle speed ranges available:

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ANTI-FRICTION SPEED AND SPINDLE ASSEMBLIES.

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CERTIFIED MALLEABLE CASTINGS
MEETS ALL A.S.T.M. SPECIFICATIONS
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Established 1901

FALLS CAST IRON SHEAVES
Solid and Split, All Sizes, All Duties
And a complete line of Power Transmission Machinery • Clutches • Pulleys • Pillow Blocks • Hangers • Couplings • *Send specifications for quotation.*
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COTTER PINS - FLAT SPRING KEYS
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Horizontal Boring, Drilling and Milling Machine
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Super Service
UPRIGHT DRILLING MACHINES
THE CINCINNATI BICKFORD TOOL COMPANY
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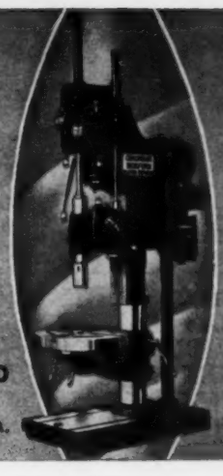

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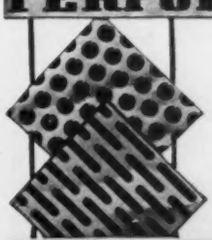

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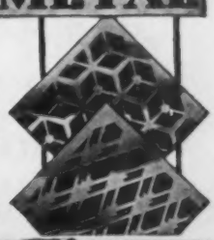

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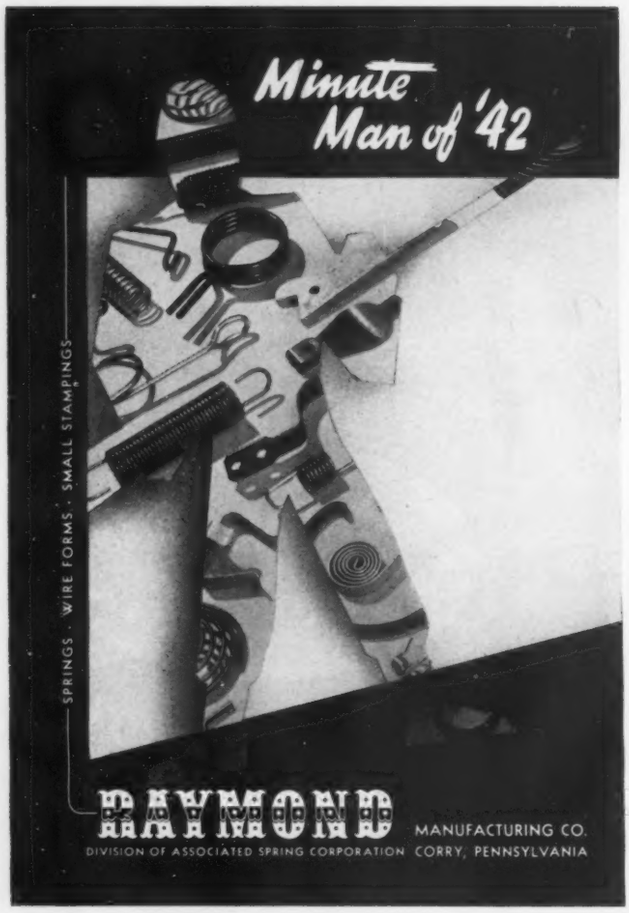
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WRITE US YOUR PROBLEM

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3 BIG REASONS
EXPLAIN THE QUALITY OF
KIDD DRAWN STEEL

(1) Careful selection of raw stock, (2) scrupulous attention to heat treating for processing, and (3) careful inspection. We have followed those three rules rigidly since 1897, and that is why KIDD steels are known as "Efficiency Steels." Our drill rods, special shapes, flats and squares, needle bar stock and special analysis steels are made by the most modern methods known to the industry.

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DRAWN STEEL CO.
Aliquippa, Pa.
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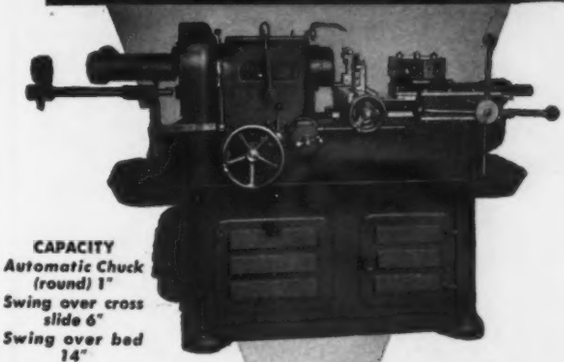
for ECONOMY—for HIGH SPEED PRODUCTION

The MOREY 2G
Back-Geared
TURRET LATHE
Timken Bearing
Self-Locking Turret and Infinite Spindle Speeds



CAPACITY
Automatic Chuck (round) 1"
Swing over cross slide 6"
Swing over bed 14"

Thousands of the MOREY 2G Turret Lathes are saving money with no sacrifice of high speed production. Economy features: Back Gears are instantly thrown in through extra large Twin Disc Clutch—Full advantage from high speed and carbide tools—Vibrationless precision and an infinite variety of spindle speeds for every job—Timken bearing—Self-locking turret. Can be furnished with tooling.

Ask for Circular 629 for full details

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WIRE AND METAL RIBBON
FORMING MACHINERY
NILSON TILTING
WIRE REELS
(Wire Reel Catalog No. 51)
Special Machines Designed and Built to Order
THE A. H. NILSON MACHINE COMPANY. BRIDGEPORT, CONN.

The Handiest Tool in the Shop!
That's what users say of the Canton Portable Crane. It relieves the larger cranes of the smaller jobs, and is always available where needed.
Equipped with load brake to prevent "drops."
Ask about our 30 day trial offer.
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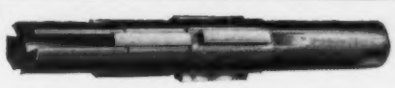
WAPAKONETA
Multicut Shear Blades and Slitters
THE WAPAKONETA MACHINE CO.
Wapakoneta, Ohio • Incorporated 1891

GOSS and DE LEEUW
MULTIPLE SPINDLE
CHUCKING MACHINES
Four, Five, Six, Eight Spindles • Work and Tool Rotating Type
GOSS & DE LEEUW MACHINE CO. NEW BRITAIN, CONN

Output Goes UP
Costs Go DOWN
with



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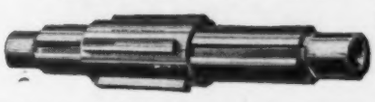
EXPANDING
MANDRELS



Internal chucks are especially suited to emergency conditions, hurry-up break-down jobs, etc. For use on lathes, grinders, shapers or millers. 14 sizes—take bores ½" to 7". Bulletin 530.

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PERFORATED METALS
Screens and grilles
in all commercially rolled metals,
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Write for literature
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Sales Offices in Principal Cities
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FLAT COLD ROLLED

TO THE MAN WHO IS CONCERNED ABOUT COLD ROLLED MEDIUM OR HIGH CARBON STRIP STEEL

Tempered— Scaleless finish, polish finish, straw or blue finish. Entire range of temper.

Untempered— All hardnesses from dead soft annealed to hard rolled.

Size Range— From 1/16" to 6½" in width. From .0015" to .065" in thickness.

Tolerance— Either standard or closer than standard (in all features).

Delivery — On application will estimate reliable prompt delivery.

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THE ATHENIA STEEL COMPANY

DIVISION OF

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CLIFTON, N. J.

Every Up-to-Date Feature Types for Every Purpose

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Universally recognized for their simplicity of design and lowest cost of maintenance.

What is your problem?

See illustrations of many types of DETROIT HOISTS — Send for Bulletin #725.

DETROIT HOIST & MACHINE CO.

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Step up production with HOBART

"Simplified" **arc welding**

Get the facts on today's greatest speed-up tool. Write HOBART Bros. Co. Box I.A. 994, Troy, O.

"One of the world's Largest Builders of Arc Welders and Equipment"

Cutting Off Machines for Sawing All Kinds of Metals

THE ESPEN-LUCAS MACHINE WORKS

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THE PROGRESSIVE MFG. CO.
Torrington Connecticut

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If your company sells to this industry your No. 1 advertising medium is The Iron Age.

Precision . . . Quality

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DUER SPRING & MFG. COMPANY
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METAL STAMPINGS · WIRE FORMS
Just a few of the more than 7000 catalog items we manufacture.
What do YOU need?
EASTERN TOOL & MFG. CO.
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Shipment via boat, truck or any railroad. Over 40 years in one location.

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KMT **KINGSBURY MACHINE TOOL CORP.**
KEENE, NEW HAMPSHIRE
Originators of the Automatic Drilling Head Unit

SHEET METAL WORK.

Small orders solicited as well as quantity production

Our facilities consist of shearing and forming equipment up to 10' and 3/16"; large number of presses, spot welders, oxy-acetylene and arc welders. Send us drawing or samples for prices.

CHAMPION SHEET METAL CO., Inc.
COR. SQUIRES AND DUANE STS. CORTLAND, NEW YORK

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OF POLICY

In the face of a great emergency, Jarecki reiterates a policy that has guided its actions in three previous wars: (1) to regard national needs as a supreme command, and (2) to make a sincere effort, while serving those needs, to meet the demands of its peace-time friends.

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VALVES ★ ★ ★ FITTINGS

JARECKI MFG. CO., ERIE, PA., U. S. A.

SCREW MACHINE PRODUCTS

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WM. H. OTTEMILLER CO. Inc.
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Drilling Machinery
Belt and Motor Spindle
One to Six Spindles
Tapping Attachments and Multiple Heads

COPPER—BRASS—BRONZE
PERFORATED
TO YOUR REQUIREMENTS
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PERFORATED METALS

FOR ALL INDUSTRIAL USES
ALL SIZE AND SHAPE HOLES—ALL METALS

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UPSET, DROP and COIN PRESSED
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AUTOMATIC EQUIPMENT
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THE CLEVELAND STEEL TOOL CO.
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660 E. 82nd St. Cleveland, O.
If it's RIVETED you KNOW it's safe

GRIFFIN
COLD ROLLED
STRIP STEEL
1/2" TO 19" WIDE
.002 TO .500" THICK
Depending on the width, within commercial practice
DESIRED QUALITY FOR
FORMING AND DRAWING
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DETROIT — E. R. Wagener, Boulevard Bldg., 7319 Woodward Avenue.
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THIS is more than a war of mechanical monsters clashing in the night . . . more than a war of production.

It is a war for markets—*your* markets! The Axis wants your business—wants to destroy it once and for all.

With so much at stake, there is no doubt you will want to do everything you can to meet this Axis threat. Two ways are open: Speed production and put 10 percent of your income into WAR BONDS! The only answer to enemy tanks and planes is *more* American tanks and planes—and your regular, month-by-month purchases of War Bonds will help supply them. Buy now *and keep buying*.

THE GOAL: 10% OF EVERYONE'S INCOME IN WAR BONDS

When you install the Pay-Roll War Savings Plan (approved by organized labor), you not only perform a service for your country but for your *employees*. Simple to install, the Plan provides for regular purchases of War Bonds through voluntary pay-roll allotments.

Write for details *today!* Treasury Department, Section R, 709 12th St. NW., Washington, D. C.

EVERYBODY EVERY PAYDAY 10%

War Savings Bonds

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Chicago Hotel

Distinguished visitors have, by their patronage, made The Blackstone one of the World's most famous hotels. Here, beautiful appointments, quiet luxury, perfect service, excellent cuisine, and sparkling entertainment in the brilliant Mayfair Room—combine to satisfy a notable clientele.

A. S. KIRKEBY, *Managing Director*

The Blackstone
South Michigan Ave.
CHICAGO

Blast 'em
with the Diamond-U
Blow Gun!

Here's the Blow Gun with which the operator can apply the softest puff of air or full airline pressure blast to his work, with POSITIVE CONTROL. Beautifully balanced, feather-light, it also has the enduring stamina for war production lines. A long time favorite in the automotive field, the "212" is winning "E"s in aircraft and other plants the country over. It's available only on an A1-J or better rating. Order from your Jobber...and buy War Bonds!

SERVICE EQUIPMENT COMPANY
MANUFACTURERS...SOUTH GATE, CALIFORNIA

PERFORATED METALS—SCREENS
Any size perforation — any gauge steel.
Promptly made to your exact specifications.
CHICAGO PERFORATING CO.
2440 W. 24TH PLACE Tel Canal 1459 CHICAGO, ILL.

STANLEY STEEL
STEEL MAKERS SINCE 1871
HOT ROLLED • COLD ROLLED • SPECIAL CARBON • ALLOYS
THE STANLEY WORKS
NEW BRITAIN, CONN. · BRIDGEPORT, CONN. · HAMILTON, ONTARIO

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PIG IRON
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MFGRS OF HIGH GRADE
FOUNDRY
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MALLEABLE
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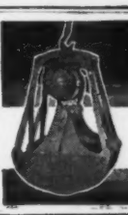
MITCO
OPEN STEEL FLOORING
Pressure Formed: 90% Open Area; Easy to Install
HENDRICK MANUFACTURING COMPANY
46 Dundaff Street, Carbondale, Pa.

Hayward Buckets



Use this Electric Motor Clam Shell for rehandling bulk materials in Industrial Plants.
THE HAYWARD CO., 40-50 Church St., N. Y.

FISCHER
for Quality
SPRINGS
COIL AND FLAT
WIRE FORMS • FLEXIBLE SHAFTS
STAMPINGS • SCREW MACHINE PRODUCTS
COMPLETE ASSEMBLIES
THE CHAS. FISCHER SPRING CO.
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WORLD'S FINEST PRE-FINISHED METALS • SHEETS & COILS
NICKEL, CHROMIUM, BRASS AND COPPER FINISHES
AMERICAN NICKELOID COMPANY
1312 SECOND ST. PERU, ILLINOIS

CLEARING HOUSE

Rebuilding Service

Used Machinery

Surplus Materials

☆ THE CLEARING HOUSE SECTION is a time-tested marketing aid for finding companies in need of the above services, machinery, plant equipment and surplus materials.

☆ Advertisements of this sort *must* yield quick results. Therefore, the appearance of a large volume of Clearing House advertisements in The Iron Age over a period of many years is the best proof of the value of this medium. No other metal-working magazine is comparable with The Iron Age in volume of advertising on used machinery, rebuilding services, etc.

☆ As of July 1, 1942, The Iron Age's readers totaled 100,700 individuals—and in this group are the high-priority manufacturers who scan closely and buy what is offered. **See *Clearing House Section on Following Pages***

THE CLEARING HOUSE

CONSIDER GOOD USED EQUIPMENT FIRST

IMMEDIATE AVAILABILITY AND DELIVERY ARE IMPORTANT FACTORS
PARTIAL LIST — NUMEROUS OTHER MACHINES ALSO AVAILABLE

AIR COMPRESSOR

694 cu. ft. Sullivan Air Compressor Class WJ-3 16"x9¾"x10". With Motor and 42"x10' Vertical Air Receiver

BORING MILL—HORIZONTAL

Niles Cylinder Boring Mill. 1—6" and 1—10" Main Boring Bar. 1—2⅞" and 1—3⅝" Bar for the side heads

BUILDINGS

45'x130' Corrugated Steel Building with 10 ton Whiting OET Crane
50'x100' Structural Steel Building with 10 ton OET Crane
52'x120' Structural Steel Building
2—50'x200' Steel Buildings with 2—5 ton OET P&H Cranes—50' span
52'x589' Steel Building. Complete with 10 ton and 2—15 ton P&H OET Cranes
60'x150' Structural Steel Building with 20' and 12' leanto. Complete with one 5 ton OET Crane

BULLDOZERS

#3 Williams & White, Arr. for Pulley Dr. Face of crosshead 7"x39". Movement of crosshead 16"
#4 Williams & White, belt driven. Face of crosshead 7½"x45" Movement of crosshead 18"

CRANES—OVERHEAD ELECTRIC TRAVELING

2½ ton Euclid	17'8¼" Span	230/3/60 A.C.
3 ton P & H	16'9" Span	220 Volt D.C.
3 ton Shepard	35'4" Span	110 Volt D.C.
5 ton Morgan	70' Span	220 Volt D.C.
10 ton PRMCO	110' Span	440/3/60 A.C.
15 ton Cleve'and	35'4" Span	220 Volt D.C.
15 ton Alfred Box	25' Span	110 Volt D.C.
20 ton P & H	47' Span	550/3/60 Motors
20 ton P & H	34'6" Span	220 Volt D.C.
50 ton J. & L.	16' Span	220 Volt D.C.

CRANE—BUCKET

#75 Lorain Bucket Crane, 60' Boom, with Gasoline Motor and Clam Shell Bucket

CRANES—GANTRY

10 ton McMyler 42' span. 4½' Overhand each end. Motors 220/3/60 A.C.
10 ton Lidgerwood 135' span. Motors 220/3/60 A.C.

CRANES—HAND OPERATED

4 ton	25'6" Span
4 ton	41' Span Including 100' Runway
5 ton	30' Span
8 ton Whiting	29' Span Including 160' Outdoor Runway
15 ton Whiting	35' Span
20 ton Whiting	42' Span
30 ton Whiting	56" Span (Two Hoists)

CRANE MOTORS

20 HP Size AW—9 P&H Hoist Motor, 1200 RPM. 220/3/60 A.C. Drum Controller.
30 HP Size AW—10 P&H Bridge Motor, 1200 RRM. 220/3/60 A.C. Drum Controller

CRANE—RUNWAY

271'10" "A" Frame Runway, designed to carry 30 ton Crane load
228' "A" Frame Runway, designed to carry 30 ton Crane load approx.
120' "A" Frame Runway, designed to carry 30 ton Crane load approx.

CRANE—TROLLEY

10 ton Cleveland Trolley, with 2—220/3/60 General Electric Motors. Gauge of Trolley wheels—4'8½"

CUTTING OFF MACHINES

8" Standard Engr. Co. Cutting Off Machine, M.D.
10" Standard Engr. Co. Cutting Off Machine, M.D.

FORGING MACHINES

¾" to 6" Ajax, National, Steel Frame

FURNACES

2500# Electric Furnace Company Annealing Furnace. Complete with loader and controller.
300# Rockwell Rivet Annealing Gas Fired Furnace. Furnace Body 3'9" wide x 6'9" long
40-60 lb. Moore Size "W" Electric Melting Furnace
750 lb. Detroit Type "A" Melting Furnace

16' PYRAMID TYPE PLATE BENDING ROLL
Capacity 1" Plate full width
Top Roll 21" diameter. Bottom Rolls 16½" diameter
Drop end housing
Motor Driven

10' NILES PLATE STRAIGHTENING ROLL
7—10" diameter Rolls
Belt Driven

#8 WILLIAMS & WHITE BULLDOZER
Arranged for Motor Drive
Stroke—24"
Die Space—60"
Face of Crosshead—16" x 72"

#3—52" RYERSON FRICTION SAW
1 H.P., 230 volt D.C. Power Feed Motor
1600 and 1800 RPM

GEAR REDUCTION UNIT

300 HP Falk Gear Reduction with 300 HP, 2200 Volt 3 phase, 60 cycle General Electric Slip-Ring Motor

GENERATING SETS

135 KW Gen. Elect. 250 volt DC Generator with direct connected 200 HP De La Vergne Engine
312 KVA Westinghouse 2300/3/60 Generator with 18"x30" Corliss Engine
400 KW Crocker-Wheeler 250 volt DC Generator with 26"x30" Mesta Uniflow High Speed Automatic Steam Engine

HAMMERS—STEAM DROP

1000# Chambersburg
1000# Erie
1250# Chambersburg
1500# Alliance, Three "V" Slides

HAMMERS—STEAM FORGING

650# Chambersburg—Double Frame
1000# Chambersburg—Double Frame
1100# Bement Miles—Single Frame
1100# Chambersburg—Single Frame
1100# Erie Single Frame
10,000# Niles-Bement-Pond—Double Frame

HOT METAL MIXER

250 ton. Complete with rocker bed, cylinders, trunnion, bearings, etc. Riveted throughout

INGOT ROTATOR

Johnston & Jennings Ingot Rotator, Motor Driven with 20 H.P. 800 R.P.M. Motor

LATHE

Allis-Chalmers Two Bar Gun Boring Lathe. Arranged for Motor Drive. Maximum capacity 12" dia. hole thru 24" dia. shaft—40' long. Diameter hole thru spindle 26". Spindle bearing 29" dia.

LEVELLER—ROLLER

75" Torrington Roller Leveller 19 Rolls, 2" Diameter, Motor Driven. Capacity .060 Gauge. (Practically New)

PRESSES—HYDRAULIC

10,000 lb. Chambersburg Self-contained Press. 28"x20" Between Columns. 14" Stroke. With Pump and Motor
600 ton Southwark Four Column Press 31" x 31" Between Columns, 18" Stroke. Complete with Pump and Motor

PRESS—TOGGLE DRAWING

#3½C E.W. Bliss Company Toggle Drawing Press 26" bet. uprights. 10" stroke of blankholder. 17¼" stroke of plunger

PRESSES—MISCELLANEOUS

#6 Bliss Horizontal Reducing Press, B.D. Stroke 8". Width of Bed 26"
#60½ Bliss Reducing Press. Belt Driven. Stroke 4" to 42". 16½" Bet. Gibs
#D45 Ferracute Press. Horizontal Double End, Screw Type, 36" Ram Stroke
#856 Toledo Rack & Pinion Press. B.D. Stroke 5" to 36"

PUMP—VERTICAL TRIPLEX

5x6 Deming Horizontal Single Acting Triplex Pump. Cap. 91 G.P.M., at 150# pres. With 10 H.P. 3 ph. 60 cycle A.C. Motor

PUNCHES—HORIZONTAL

#2 Hilles & Jones Horizontal Punch. Capacity 1" thru 1"

PUNCH—MULTIPLE

#E Long & Allstatter Double Crank Multiple Punch. T&L Pulley Drive. 114" Between Housings. 340 tons

PUNCH & SHEAR COMBINATIONS

No. 2 Hilles & Jones Double End Punch & Shear, M.D. 22 throat. Cap. to punch 1" thru 1", shear 6"x1"
No. 6 Hilles & Jones Punch & Shear, 54" Throat, Cap. to punch 2½" thru 1⅛", shear plate 1¼" thick
Long & Allstatter, Double End Punch & Shear, 12" throat. Cap. to punch 1" thru 1", shear ⅞"x1¾". Attachments
Size "B" Long & Allstatter Single End Punch, 30" throat. Cap. to punch 2¼" thru 1¼"
Style F Niles-Bement-Pond Single End Punch, Arranged for motor drive, 18" Throat. Capacity 3" thru 2"
Rocker River Single End Punch, 48" Throat. Capacity 1¼" thru 1", Arr. M.D.

ROLLING MILLS

10"x12" United E & F Co. Single Stand Two High
10"x16" United E & F Co. Single Stand Two High
12"x20" Philadelphia Roll & Machinery Co. Single Stand—Two High
14"x19" Waterbury Farrel Four Stand 2 High
30"—3 High Sheet Bar Mill

SAW—HOT

48" U.E &F. Co. Sliding Frame Hot Saw, arr. M.D. Stroke—4'6".

SCALE

4000 lb. Toledo Overhead I-Beam Track. Scale with hand operated chain hoists connected to two 2-ton trolleys. Complete with app. 800' of 8" I-Beam Track

SHEAR—ALLIGATOR

42" Doelger & Kirsten No. 3½ Alligator Shear. Belt Driven. Capacity 4½" round, 4¼" square

SHEAR—ANGLE

4x4x½" Long & Allstatter Double Angle Shear, Arr. M.D.
8"x8"x1¼" Hilles and Jones No. 5 Double Angle Shear, Geared Motor Drive

SLITTER

48" Yoder Slitter with 10 H.P. Motor and Starter cap. 48" in width, 11 gauge or lighter

SPACING TABLE

136' Thomas Spacing Table. Capacity to handle Plate 60" Wide. Stiffener Angle 6x4, 50" long Angles 8"x8", 24" Beam—Flange Punching 18" Channels—Web Punching, 20" Standard Beams—Web Punching; Complete with attachments necessary for these operations

STACK—BLOOMING MILL

3'x80' Blooming Mill Stack. Made up in 10 ft. sections with 4½" brick lining

STRAIGHTENERS

⅛", ⅝" Shuster Straightening & cut-off Machines. Belt or Motor Drive
1" Kane & Roach Band Straightening Machine
Torrington 12 Roll Rod Straightener. Capacity ¼"—1⅜" hex., ¼"—1⅛" Round
#5 18⅝ Littell Single Rack and Pinion Feeding and Straightening Machine, motor driven. Five Straightening rolls 3⅛" dia. x 18½" long. One set pinch rolls 5⅛" dia. x 18½" long

Manufacturing RITTERBUSH & COMPANY, INC. Equipment
30 CHURCH ST
NEW YORK CITY

Confidential Certified Appraisals — *Consulting Engineering Service*
Liquidations—Bona Fide Auction Sales Arranged — *Surplus Mfg. Equipment Inventories Purchased*

THE CLEARING HOUSE

In stock

Every machine listed in this column is in our warehouse at press time.

RAILROAD SHOP TOOLS

48" PUTNAM Car Wheel Borer
52" BETTS Car Wheel Borer
42" PUTNAM Car Wheel Lathe
42" NILES Car Wheel Lathe
48" NILES Car Wheel Lathe
85" PUTNAM Driving Wheel Lathe with Quartering Attachment, M.D.
27" BRIDGEFORD Journal Truing
Set of Locomotive Cylinder Chucks

THREADING MACHINES

2" B&K Pipe, LANDIS Head
2" B&K Motor Drive with motor
4" B&K LANDIS HEAD and cut-off
4" LANDIS with cut-off
6" B&K, cut-off, M.D.
10" STANDARD Pipe, S.P.D.
14" E.C.&B., S.P.D.
¾" GATERMAN Vert. Tapper
4" BAKER Vert. Tapper
16" BAKER Vert. Tapper

PUNCHES AND SHEARS

20" Throat H&J No. 00 ¾" x ⅜"
42" Throat L&A No. 2 1" x 1"
42" Throat H&J No. 2 1" x ⅞"
42" Throat H&J No. 4 1¾" x 1"
54" Throat H&J No. 5 1¾" x1⅛"
60" Throat L&A No. A 1¾" x 1"
24" Throat L&A Double End ¾" x ¾"
RT 40 SCHULTZ-NAUMAN Beam Shear
6" x 6" x ⅝" Angle Shear
L&A Multiple Punch 6" x 72"
NIAGARA Circle Shear ⅛" x 18"
Washer Press, SOUTHWARK No. 3

SIMMONS
ENGINEERED
Machine Tool
REBUILDING

SIMMONS MACHINE TOOL CORP.
1721 North Broadway, Albany, N. Y.
N. Y. Office: 149 Broadway

IN STOCK

AUTOMATICS

¾" Gridley Model F, four spindle
1¼" Gridley Model F, four spindle
No. 515 National Acme, four spindle
No. 52 National Acme, four spindle

BROACHES

No. XB10 Oilgear Hydraulic Twin spindle
15 Ton Hercules Vertical

DRILLS

4' Prentice Radial
No. 1½ Foote Burt, 2 spindle
No. 15½ Foote Burt Fixed Center
No. 37 Natco Multiple Spindle
No. 1 Bausch, 8 spindle
Pratt & Whitney Gun Barrel, 2 spindle, m.d.

GEAR CUTTERS

No. 5 Cincinnati Automatic Gear Cutter
No. 3 Brown & Sharpe Automatic
No. 36 BM Gould & Eberhardt Rougher, three spindle
No. 6 Fellows Gear Shaper
96" Gleason Gear Planer
15" Gleason Spiral Bevel Generator
18" Gleason Gear Tester
No. 5A Lees-Bradner Gear Generator
No. 10 Lees-Bradner Gear Grinder
30" Rochester Gear Tooth Rounder

GRINDERS

6x18 Landis Cylindrical
10"x20" Landis Cylindrical hydraulic
18"x96" Brown & Sharpe Cylindrical
8" Heald Rotary Surface
No. 55 Heald Cylinder
No. 60 Heald Cylinder
No. 24 53" Gardner Disc

LATHES

17"x 8' Sidney, c.d.
24"x14' Reed Prentice, g.h.
24"x16' Whitcomb Blaisdell, c.d.
26"x14' Niles-Bement-Pond, c.d.
17"x 8' Wickes Production, c.d.
3½"x60' Fitchburg Lo-Swing, g.h.

TURRET LATHES

No. 3A Warner & Swasey, g.h.
No. 6A Potter & Johnston, g.h.
3"x36" Jones & Lamson, g.h.
No. 9 Bardons & Oliver, c.d.

MILLS

No. 1 Milwaukee Manufacturing, s.p.d.
No. 5C Becker, Vertical
4" Bement Miles Horizontal Boring

MISCELLANEOUS

No. 3E Lees-Bradner Thread Miller, collet type
Wicaco Oil Groover
2" Pratt & Whitney Duplex Spline Mill
No. 1 Mitts & Merrill Keyseater
No. 253 Dreis & Krump Press Brake, m.d. (4)

PLANERS AND SHAPERS

54"x54"x16' Niles-Bement-Pond Planer, 4 heads
36"x36"x12' Niles Double End Planer
32"x32"x10' New Haven Planer
18" Lodge & Davis Shaper, c.d.
20" Rockford Shaper, c.d.
20" Wolcott Shaper, c.d.
24" Cincinnati Shaper, c.d.

TAPPERS

½" Rickert Shafer Radial

INDIANAPOLIS MACHINERY & SUPPLY CO., INC.
1959-69 South Meridian Street
Indianapolis, Indiana

EASTERN BRANCH:
44 WHITEHALL STREET, NEW YORK, N. Y.

MOREY

Dependable Used Machines

LA POINTE No. 2 two spindle Broach—M. D.
G. & E. 48" Gear Cutter
WHITON No. 15 Auto. Gear Cutter
FELLOWS No. 6 Gear Shaper
LA POINTE No. 2 Broach
GLEASON 37" Bevel Gear Planer
GLEASON 10" Spiral Bevel Gear Generator
GLEASON 6"-11"-18" Bevel Gear Generator
LANDIS 3½" Internal Hydraulic Race Grinder
LANDIS 16"x36" Plain Cyl. Grinder—M. D.
NORTON 16"x50" Crankshaft Grinder—M. D.
HEALD No. 60 Internal Grinder
LONG & ALSTATTER Double Angle Shears
GARDNER No. 6 Dble. End BB Disc Grinder

NORTON 10x96 Plain Grinder—Arranged for motor drive, including motors

P. & W. 6" x 132" Thread Miller
AUTOMATIC MACHINE CO. 12" x 4' Threading Lathe
BRIDGEFORD 27" x 10' Boring Lathe
P. & W. No. 12 Multi-Spindle Drill
NATCO C-13 Hyd. Multiple Spindle Drill
NATCO C-11C Multiple Spindle Drill
BLISS No. 31 Power Press
ESPEN LUCAS No. 138 Cold Saw—Cap. 12" Rd.
NEWTON No. 197 & No. 200 Cold Saws
COCHRANE & BLY No. 5 Cold Saw
COULTER 2 spindle Diamond Borer—M. D.
LANDIS 4" Single Head Bolt Cutter
ACME 1" All Steel Upsetter
AJAX 3" All Steel Upsetter
SAUNDERS 8"-18" Pipe Threader
TREADWELL 12" Pipe Machine
KELLER E3 Auto. Profiler (Die Sinker)
GISHOLT Precision Balancing Machine

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MOREY
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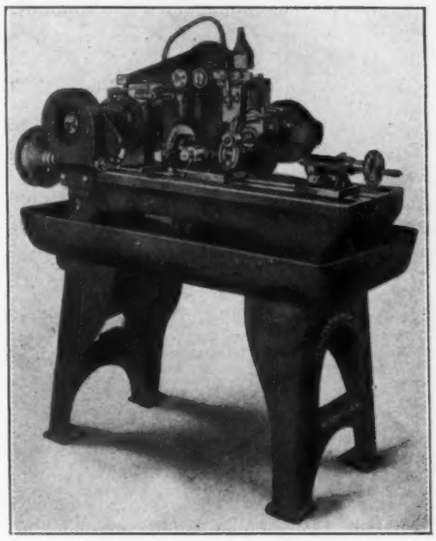
410 BROOME ST., NEW YORK

THE CLEARING HOUSE

EMERMAN—Chicago *offers*

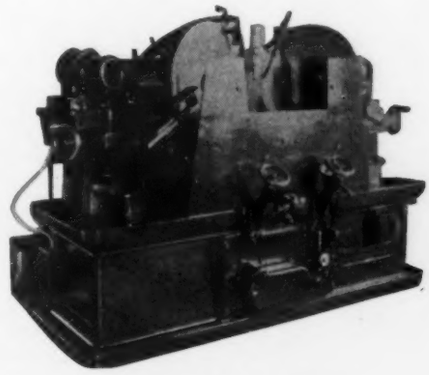
GEAR MACHINES

IMMEDIATE DELIVERY



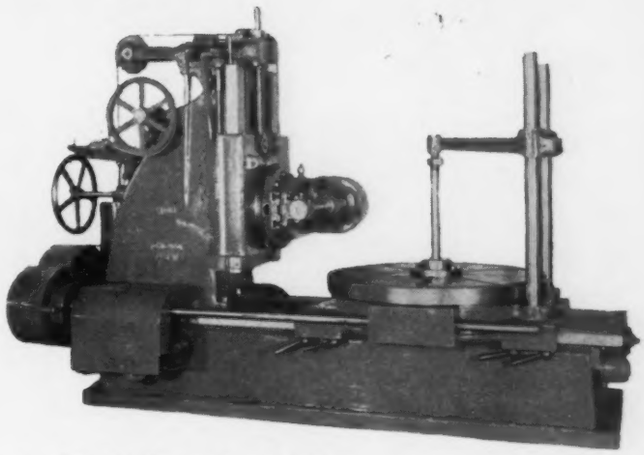
1—2½ Bilton Gear Cutter

1—No. 3 36″ Brown & Sharpe Gear Cutter
1—No. 4 36″ Brown & Sharpe Gear Cutter
1—No. 13 Brown & Sharpe Gear Cutter
1—24″x8″ Gould & Eberhardt Gear Cutter
1—36″ Gould & Eberhardt Gear Cutter
1—52″ Gould & Eberhardt Gear Cutter
1—No. 6 60″x20″ Cincinnati Gear Cutter
2—No. 1128 Michigan Gear Cutters



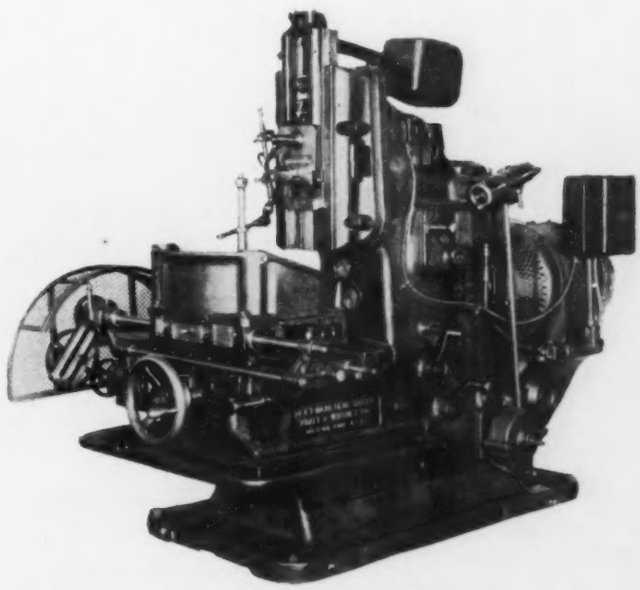
2—Pratt & Whitney Gear Grinders

1—Cross Double Head Tooth Rounder
1—No. 40 Cross Gear Tooth Rounder
1—20″ Ingle Gear Tooth Rounder
2—No. 3 Peerless Gear Chamfering Machines
1—Lipe Gear Chamferer
1—Lipe 2-Spindle Gear Chamferer



1—No. 48 Jones Gear Hobber

2—National Gear Lappers
1—15″ Gleason Bevel Gear Tester
1—4M Fellows Involute Tester
1—8-Spindle Cleveland Spline Hobber
4—15″ Gleason Gear Generators
3—15″ Gleason Gear Roughers
4—No. 5A Lees Bradner Gear Hobbers
1—No. 36 St. 4-Sp. Gould & Eberhardt Gear Hobber
1—No. 3 Barber Colman Gear Hobber
2—No. 12 Barber Colman Gear Hobbers



1—14″x7″ Pratt & Whitney Gear Shaper

LOUIS E. EMERMAN & CO.

CHICAGO, ILLINOIS

THE CLEARING HOUSE

MISCELLANEOUS

9/16" Gridley Model G automatic.
1" Cleveland Model J double end threading, pointing, turning or drilling.
No. 16 Gisholt Simplimatics.
1400 cu. ft. 20"x12"x14" Sullivan WJ3 compressor.
AC die casting machine.
22½" Barnes 4 spindle heavy duty drill.
Nos. 0 & 00 Garvin horizontal drills.
No. 1 Baush 16 spindle drill.
No. 13 Pratt & Whitney 16 spindle drill.
3' Cincinnati radial drill.
16" Fosdick 6 spindle sensitive drill.
15½ & 15½F Foote Burt mfg. drills.
3-Way Foote Burt drill with heavy multiple heads.
No. 1D American carburizing furnace.
No. 36 BN Gould & Eberhardt multiple spindle gear cutter.
National Cleveland Model B gear checker.
Lipe double spindle gear chamferer.
17"x36"-48" Norton double head hyd. crank pin grinder.
18" Gardner semi-automatic disc grinder.
No. 41 Ransom 7½ H.P. motor drive double end grinder.
Pratt & Whitney worm or thread grinder.
Nos. 50 & 60 Heald cylinder grinders.
Hutto vertical single spindle Model M.D. honing machine.
500 lb. Bradley helve hammers.
2½"x18" No. 4 Mitts & Merrill keyseater.
14"x8' Lodge & Shipley lathe.
No. 3 Wood tilted turret lathe.
13"x6' Automatic threading lathe.
16"x10' LeBlond Rapid Production lathe.
18"x7'6" Wickes Rapid Production lathe.
20"x8'6" Wickes Rapid Production lathe.
4 & 6 cylinder Melling turning lathes.
36" Niles car wheel boring machine.
Hall planetary thread miller.
No. 3C Lees Bradner thread miller.
Nos. 1 & 1½ Knight vertical millers.
No. AB Becker vertical miller.
60" Ingersoll rotary continuous miller.
25"x25"x14' Ingersoll slab miller.
Nos. 10 & 45 Bilton Producto - Matic millers.
Nos. 1 & 1A Davis & Thompson double end continuous millers.
No. 3 Sundstrand rotary "Rigidmil."
No. 1B Campbell nibbler.
Young Bros. two compartment oven.
1¼"x1" Cleveland 12" throat horizontal punch.
1¼"x1" Long & Allstatter 12" throat single end punch and shear.
54" McKay sheet level roller.
No. 1A Ajax taper forging roll.
12" Dill Slotter.
1½" Acme upsetter.
2" National upsetter.
2½" & 4" Ajax upsetters.

We may be able to move your surplus tools. Tell us about them. "Keep 'em Flying"

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Saginaw, Mich.

ELECTRIC FURNACE

1000 lb. Swindell-Dressler with hydraulic tilting cylinder, pump, motor and three 200 KVA. Transformers, 22,000 volts primary, 90 volts secondary. Used on experimental work. Immediate shipment.

ROLL LATHES

54"x20' Standard, compound Geared Head, for direct motor drive, with piano and necking rests. Used little. Fine condition.
42"x20' United, 4-step cone, with piano and necking rests and countershaft. Good condition. Both for Quick Shipment.

MISCELLANEOUS

Brake, press type, #1050 Verson.
Brake, Press type, #1050 Verson, motor drive.
Bulldozer, No. 0 Williams-White.
Drill, 16 Spdl. Natco, #2 MT.
Drill, 21" Cincinnati BG, PF., #3 MT., belt.
Grinder, Cyl. No. 5 Landis, M.D.
Keyseater, No. 2 Mitts & Merrill.
Lathe, 16"x10' Sebastian, cone drive.
Lathe, 34"x18' & 24"x14', cone.
Lathe, 72" short bed, no tailstock, M.D.
Levelling Roll, 54"x4¼" McKay, 17-rolls, AC. motor.
Motor, 10 HP. C-W., 230 V. DC. 1400 Rev. (new)
Planer, 42"x42"x10', 1-rail, 1-side head.
Planer, 36"x36"x12' Flather, 2-hds., M.D.
Press, D.C. No. 6 Niagara, 36" betw.-hsgs., M.D.
Press, S.C. SS. No. 2 Manville, 1¼" str. Pl. (2)
Punch, S. E. #7 L. & A., tht. 4", belted M.D.
Punch, Multiple, Bertsch, 48" betw. hsgs., M.D.
Shear, Rotary, #15A, Niagara, Circl. Att.
Shear, Bar, United, open front, 12" blade, cap. 10"x1½", for M.D.
Shear, Bar, Fischer, open front, cap. 10x12", M.D.
Threading Mach., Auto. 2" Rickert-Shafer, boring & chamfering tools, for M.D.
Welders, Butt, 200 & 300 KW. Winfield, 60 cy. 440 V.

GALBREATH MACHINERY CO.
306 EMPIRE BLDG. PITTSBURGH, PA.

REBUILT MACHINE TOOLS

Available for Shipment

MILLING MACHINES
#1 Garvin, Universal
#2 Kempsmith, plain
#4 & #6 Becker, vertical
#8 Pratt & Whitney Automatics, 5" x 16"

LATHES
14" x 8' Lodge & Shipley, quick change, dir. motr. dr.
20" x 10' Monarch, quick change, taper attach.
20" x 10' Hahn Larman, geared hd., quick change
20" x 10' Lodge & Shipley, motorized
24" x 10' Bridgeford, quick change gear, taper att.
38" x 16' Bradford, taper att.

TURRET LATHES
1—⅝" Asme Univers., 2 power feeds
2" Acme, bar and power feeds
2½ x 24" Jones Lamson, bar feed, geared head
21" Gisholt, 3½" spindle cap., 2 power feeds
24" Gisholt, 3½" spindle cap., 2 power feeds, taper att.

SHAPERS & PLANERS
16" Ohio Shaper
20" Steckbridge, motorized
24" x 24" x 6' New Haven Planer, 1 head
36" x 36" x 10' Gray Planer, 2 swiveling heads
42" x 42" x 12' New Haven Planer, 3 swiveling heads

GRINDERS
#1 LeBlond Univ. Tool & Cutter
6" x 32" Norton, direct motor drive
10" x 20" Landis Cylindrical, motorized
16" x 50" Norton, direct motor drive

GEAR MACHINERY
3" x 36" Brown & Sharpe
25" Fellows Shaper

RADIAL DRILLS
2½' Mueller, motorized
5' Davis, motorized
5' Cincinnati, motorized

PRESSES & BROACHING MACHINES
#3 Ferracute, 2" stroke
#3 LaPointe Broaching Machine

MISCELLANEOUS
#16 Pels Univ. Punch & Shear, ⅝" plates, 4 x 4 x ½", angles, etc.
Hilles & Jones, 1" cap., 36" gap Shear & Punch
Sandbl. Cabinet 36 x 48"

NEW 6 x 18" SURFACE GRINDERS, MOTOR IN BASE

GRAHAM MACHINE TOOL, Inc.
231 CENTRE ST. NEW YORK CITY
WOrth 4-8125-6

OTT MACHINERY SPECIALS

Automatics, CLEVELAND, 1 1/16" Mod. A.
Automatics, CLEVELAND, ⅞, 1 1/16, 1½ & 2½" Mod. B.
Automatics, GRIDLEY, 2¼, 3¼ & 4¼" S.S.
Automatics, NEW BRITAIN, #22, 23 & 24.
Automatics, POTTER & JOHNSTON #5A & 6A.
Drills, #17D MOLINE Hole Hog, 6 spdle.
Gear Hobbers, #3 & 12 BARBER-COLMAN.
Gear Hobbers, LEES-BRADNER #5A.
Gear Shapers, FELLOWS, #6 & 36".
Grinders, BRYANT #6, 15 & 18 Internal.
Grinders, LANDIS 10x36" Hydraulic, M.D.
Grinders, NORTON #B 81—14x36" C.S.
Grinders, NORTON 10 & 14" x 36" Plain, M.D.
Lappers, 26" BETHEL-PLAYER.
Lathe, PUTNAM 60/85"x17'.
Milling Machines, #1, 2, 3 CRAFTMAN, Rotary.
Milling Machines, BRIGGS MFG., A & B.
Milling Machines, KEMPSMITH #32 & 33 Mfg.
Planers, BEDFORD & PATCH, 36"x13' Open Side, with 1 Rail & 1 Side Head, M.D.
Presses, TOLEDO #34, Solid Back Geared.
Presses, NIAGARA #77B Dble. Crank.
Presses, FERRACUTE Solid Back, #P2, 3 & 4.

OTT MACHINERY SALES, INC.
540 Second Ave. Detroit, Mich.

HUNDREDS OF TOOLS IN STOCK

BURNISHER—Fellows Gear Tooth
CAM CUTTER—Manville
CHUCKING MACHINE—Goss & DeLeeuw
CHUCKING MACHINES—Potter & Johnston
DEGREASER—Colt Autesan
DIE SINKERS—Keller #E 2 #E 4
DRILL—Baush Mult. Spindle
GEAR CUTTER—Whiton #14
GEAR GENERATORS—Lees-Bradner No. 5A
GEAR GENERATOR—Gleason 11"
GRINDER—B & S 14"x80" Univ.
GRINDER—Farrel Roll
GRINDER—Heald No. 55 Internal
HAMMERS—Chambersburg, 1500 lb. Steam Drop
HAMMER—Standard 800 lb. Automatic Drop
HEADER—W-F 1½" Cap. Ball
LATHES—Le-Swing 4x36, 4x60, 3½"x108"
LATHE—Reed 26"x17'
LATHE—Bullard 28"x14'
LATHE—Niles 28"x10'
LATHE—McCabe 28"-48"x10'
LATHE—Putnam 28"x23'
LATHE—New Haven 30"x14'
MILLER—Lees-Bradner, #3-B, Internal
PLANER—P & W 30"x30"x11'
PLANER—Cincinnati 72"x60"x12'—3 Hd.
PRESS—Z & H #8½ Percussion
PRESS—Max Ams 48" Double Crank
REAMER—Baush Gun Barrel
ROLLING MILL—12"x12" Steel
SLITTER—W-F #2 Gang
SPRING COILER—Baird
UPSETTERS—4" & 5" Acme, Ajax, National

"America's Leading Machinery Rebuilders"

BOTWINIK BROTHERS, INC.
343 Welton St., New Haven, Conn.

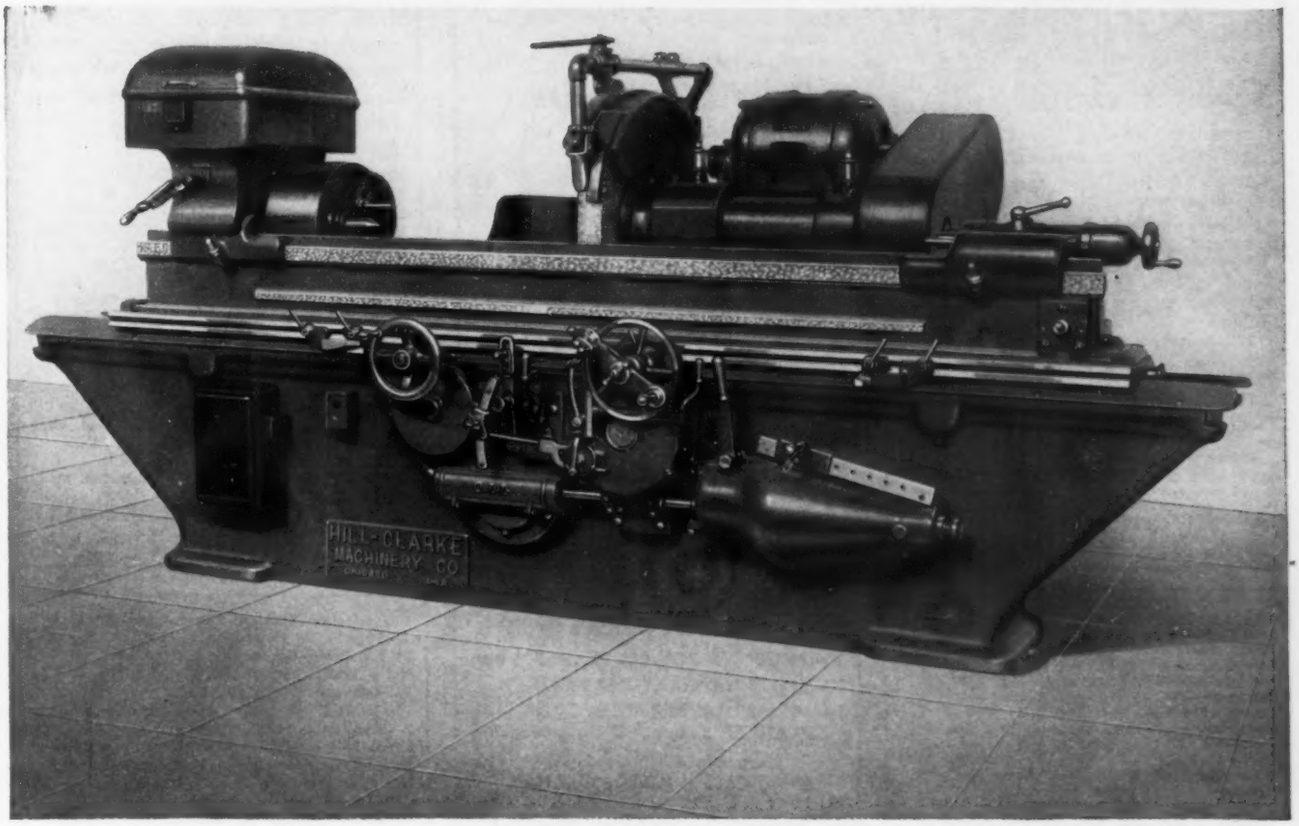
ROLLING MILLS and EQUIPMENT
FRANK B. FOSTER
829 OLIVER BUILDING PITTSBURGH PA
Cable Address FOSTER Pittsburgh

PRATT & WHITNEY #12 Production Millers
1 SELLERS 36" x 36" x 9' Planer—4 Heads
1 POWELL 36" x 36" x 10' Planer
1 INGERSOLL Gap Type Slab Miller
1 ROWBOTTOM Automatic Cam Miller
1 NATIONAL 40" x 18' Lathe
1 YODER 20 head roll former
8 SHUSTER Automatic Wire S & C Machines 1/16 to ½
1 OHL 10' Press Brake & Shear

NATIONAL MACHINERY EXCHANGE
128-138 MOTT ST. NEW YORK, N. Y.

THE CLEARING HOUSE

Grinders for Micro-Finish



HILL-CLARKE MODERNIZED CYLINDRICAL GRINDERS

give you a finish within a few micro-inches even when using standard grain free-cutting wheels. Contributing to this achievement is a patented multiple V-belt drive from a constant speed motor to the work spindle.

Throughout the machines there are refinements in design, fitting of components, minimized vibration which make possible extreme accuracy in all grinding operations. An accurately fitted wheel slide with cross feed screw mounted in ball bearings provides sensitive wheel control essential to duplicate work within close limits. Write for literature on Hill-Clarke Grinders available in the following sizes

10 x 36	14 x 36	14 x 72	16 x 72
10 x 50	14 x 50	16 x 50	18-30 x 96

HILL-CLARKE MACHINERY CO.

647 WASHINGTON BOULEVARD CHICAGO

PROMPT SHIPMENT

DRILLS

2-spindle Henry & Wright b.b. #3 M.T.
6-spindle National Acme Horizontal Drill.

LATHES

26"-50"x18' McCabe 2-spindle, belt drive.
24"-48"x12' McCabe 2-spindle, belt drive.
21"x8' LeBlond 3-step cone DBG quick change mtzd.
26"x10' Crawford, motorized, quick change.
20"x14' Springfield, geared head, single pulley drive, quick change.

TURRET LATHES

28" Bogart, belt drive, 4" hollow spindle.
24" Gisholt, motor drive, 2½" hollow spindle.
25"x10' LeBlond, motorized, quick change.
21"x 8' LeBlond, turret on carriage, QC.
3"x36" Jones & Lamson, geared head, bar equipment.
Fitchburg LoSwing, 3½"x60".

SHAPERS & PLANERS

16" Smith & Mills, single geared, belt.
16" Flather, single geared, belt.
16" Springfield, single geared, belt.
24"x24"x6' Pond Planer, one head.

MISCELLANEOUS

#6 Cochrane Bly 24" Cold Saw.
2½ to 8" Williams Pipe Machine, motor drive.
Henderson geared Forming Press, 40" between housings with dies.
200 ton Caldwell Wheel Press, 36" between bars.

THE O'BRIEN MACHINERY CO.

OFFICE: 113 NORTH THIRD STREET, PHILADELPHIA, PA.

HYDRAULIC PRESS

1000 ton Hydraulic Press built by R. D. Wood Company, up-moving type, 6 posts, platen 42" x 108", stroke 18", daylight space 36", complete with pump accumulator, motor, compensator and high pressure piping and fittings. A-1 condition.

BROACH, No. 2 LaPointe, M.D.
GEAR CUTTERS, Spur 30", 36" & 40"
GEAR PLANERS, Bevel 36" & 54" Gleason
GRINDER, Univ. No. 5 B & S, 20"x72", B.D.
GRINDER, Cyl. 18"x30"x96" Norton, M.D.
HAMMER, Steam Forging 800# N-B-P
PLANER, 30"x30"x10' Powell, 1 head B.D.
PUNCH, "C" Cleve., 13/16"-¾", throat 24"
PUNCH, 3-A Royersford, 1"-¾", throat 10"
PUNCH, "C" Cleveland, 1"-⅞", throat 24"
PUNCH, "EE-1" Cleveland, 1"-1", throat 30"
PUNCH, "EF" Cleveland, 1¼"-1", throat 60"
PUNCH, Horiz. #2 H & J, 1"-1", throat 14½"
PUNCH, Mult. L&A, "E", 340 tons, bed 10'8"
WHEEL LATHE, 78" Bement Miles, Dbl. end.
SHEARS, Squaring, 40", 48"x¼", M.D.
SLOTTER, Portable 60" Morton, M.D.
SLOTTER, 15" Dill, table 34" diameter, M.D.

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10,000# Chamb. Hammer, Guided Rod
Brake—10' x 10 ga. Ohl
Bevel Shear—¾" Lennox
Bolt Cutter—1½" Landis, Dbl. spdl.
Bolt Cutter—3½" Acme Sql. Hd.
Bulldozer—No. 25 Williams-White
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Compressor—690 ft. Chicago, 19 & 14x12
Drill—No. 30 Kingsbury
Drill—5' N.B.P. & 5' Ridgway
Drill—Single & Double Spl. Avey
Grinder—No. 60 Heald Internal
Grinder—No. 5 Landis Cylinder
Forging Press—200 Ton Watson-Stillman
Hammers—Steam Drop, 1000-1250-2000 lb.
Press—No. 59 Toledo S.S. 12" Stroke
Punch—Dbl. End 36" x 14" Cleve. E.F., A.J.
Punch—21" H&J #2, 1⅛" thru 1"
Punch—28" H&J #3, 1" thru ⅞"
Punch—36" Bertsch ⅞" thru ⅞"
Shear—48" x ¼" Garrison, A.C., M.D.
Shear—Slitting, 36" Throat Lennox ¾"
Turret Lathes—21" & 24" Gisholt
Washer Mach.—#5 Southwark, Cap. 6" x ¾" Washers

W. E. BRANDT—Machinery Sales
Phone Co-2103
513 Empire Bldg. Pittsburgh, Pa.

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1—24"x24"x6' POWELL PLANER, 1 hd.
1—24"x24"x8' GRAY PLANER.
1—60"x48"x14' BERTRAM OPEN SIDE PLANER, 3 hds., D.C., reversing M.D.
1—60"x60"x16' POND PLANER, 4 hds., D.C., reversing M.D.
1—72"x72"x16' CINCINNATI PLANER, 2 hds., heavy.

ROSENKRANZ MACHINERY CO.
30 Church Street New York City

24" Gleason Straight Bevel Gear Planer.
2—10'-6" Ohl Power Press Brakes, 10 ga.
24" Newton Combination Cold Saw.
No. 8 Whiting Punch 24" Tht. 1 1/16" x 1".
14' Garrison Power Shear, ¼" cap.
10' Dreis & Krump, all steel Squaring Shear.
2—6-sp. Leland-Gifford Drills, B.B.
Lewis 24" blade Alligator Shear, cap. 5".
No. 3-B La Pointe Broaching Machine.
No. 4 Adams-Farwell Gear Hobber.
27"x16' Bridgeford Lathe.
10"x10" Napier Band Saw.
4' Fosdick Radial Drill.
2—No. 3-F Foster Fastermatics.

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Bliss automatic combination feed press. Similar to 202-S. Four heads. Like new.

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Kodak Park, Rochester, N. Y.

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GLEASON 11" Bevel Gear
BROWN & SHARPE 26", 36" Gear Cutters
BARBER-COLMAN No. 2 S.P.D.

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96 INCH GLEASON COMBINATION BEVEL and SPUR GEAR PLANER

CAPACITY: Bevel or Spur gears to 96" Dia. x 24" Face, unlimited pitch.
Motor Driven with 220 Volt DC 1000 to 1800 R.P.M. Motor.
With large assortment of cutters.

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300-ton Dunning & Boschert Hydraulic Wheel Press with self-contained Pump

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BLISS, TOLEDO, V & O, ETC.
REBUILT—GUARANTEED

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IMMEDIATE DELIVERY

16" PUTNAM SLOTTER

Motor Driven.

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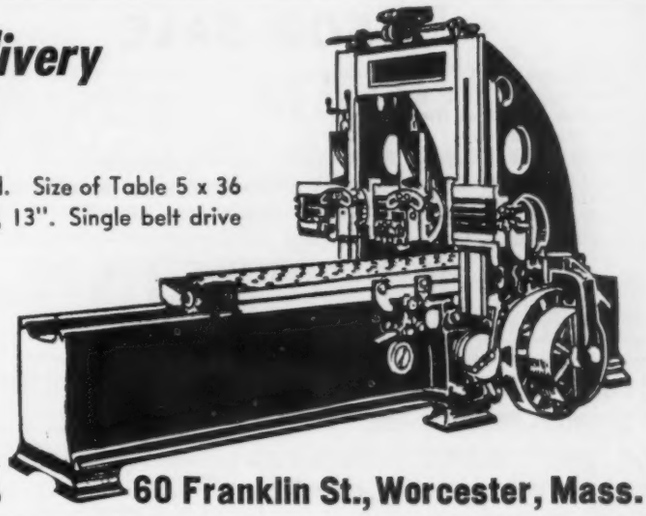
Howard 8474

Offering for Immediate Delivery at Outstanding Low Prices



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WOODWARD-POWELL 36 x 36 x 18' Three Heads. Two on cross rail, one on the side, Motor drive. Size of Table 34" x 15'. Friction type feed clutch, rack feed to rail. Single belt driven rail elevating drive.

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National 5", guided overarm heading slides
Ajax 2½"-3", suspended slides
Older style box type slides 1"-5"

HAMMERS
Bradley 40#-60#-80#-200# Helve
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Bolt, nut and rivet machinery for both hot and cold manufacture
Complete wood screw equipment

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Solid Back Nos. 2-3-4-5
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Thomas Heavy Duty-Beam-Punch Ram area 32" x 38"
D. & K. Power Apron Brakes 10' 10 ga.
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48" Oesterlein Tilted Offset Miller
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Yoder Cold Slitter
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Bar Shears—Buffalo 1½-2½" cap.
54 single and double end punches and shears
Hydraulic presses—880 ton, 1500 ton
Landis Nipple Threaders, 2-sp. 1¼"-2".

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GUARANTEED BY

A TIME TESTED, RELIABLE COMPANY

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GEAR CUTTERS
No. 60BM Gould & Eberhardt Bevel Gear Rougher (2)

GRINDERS
(See page 163, Hill-Clarke Cylindrical Grinders)
22"x96" Norton Plain, Motor Drive, Roll Forming Attachment
No. 40 Bryant Plunge Cut, Wide Wheel, Oscillating
No. 10 Lees-Bradner Spur Gear Grinder
1½" dia. New Yankee Drill Grinder
No. 60 Heald Cylinder

LATHES
3½"x53" Fitchburg Lo-Swing
No. 4 AC LeBlond Auto. Duplex Crankshaft

SLOTTERS
10" Newton

MISCELLANEOUS
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No. 4 Gaterman Tapper 5/16" cap.

HILL-CLARKE MACHINERY CO.
647 W. WASHINGTON BLVD. CHICAGO

VAN NORMAN GRINDER
1—#3. Plain Cylindrical Grinder. Capacity, 7" x 16" between centers, Motor driven with Single phase motors, Pump & Tank.
1—Rottler Piston Grinding & Grooving Machine, Motor drive, Pump & Tank.
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Cleveland Model C Punch & Shear, 24" throat, architectural jaws.

No. 3 Thiel Filing Machine.

8-ft. Brake for 12-gauge.

½" National Bent Tap Nut Tappers.

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ELYRIA, OHIO

PUNCHES AND SHEARS
1 small Schatz cast steel Tri. Combn. Punch & Shear.
1 24" Pels S.E. Punch, Capty. 1"x¾".
1 24" L. & A. No. 3 Punch. Capty. ⅞"x⅞".
1 48" Quickwork No. 5 Rotary Shear ½" Capty.
1 #25U Buffalo Tri. Combn. punch & shear, armor plate, 42" throat punch end. Punch 1" x ⅝". Shear 4" x ½" angles.
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1—No. 62 Bliss Punch Press, M.D.
1—No. 1A Wm. Sellers Tool Grinder
1—No. 3 Holmes Tilted Tapper
1—No. 1 Garvin Tapper
1—No. 2 Baxendale Punch Press, M.D.
1—Universal Gear Tester
2—Toledo Electric Welders
1—No. 2X Hannifin Air Arbor Press
CENTRAL MACHINE TOOL CORPORATION
122-126 Nebraska Ave. Toledo, Ohio

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FOR SALE

1—Enterprise 18" Flash Trimmer
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1—500 KVA Electric Furnace Transformer
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1—Ajax Bolt-heading Machine
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2—Hydraulic Pumps
1—Base for 6,000# Chambersburg Hammer
1—100 KW M. G. Set
1—200 HP MD G. E. Motor
2—100-ton Ladles

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NEW BEAMS FOR SALE

1 C Beam 10" CB 103—24' long—100# per ft.
1 C Beam 14" CB 145—45'6" long—127# per ft.
1 C Beam 27" CB 271—25'6" long—98# per ft.
1 C Beam 30" CB 301—36'9" long—132# per ft.
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50 ton Shipyard or Dock Crane
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SPECIALS IN D. C. MOTORS

HP	Make	Type	Volts	Speed
2—1500	Whse.	Interpole	550	330
1— 800	G.E.	MPC	600	600
1— 600	Whse.	Interpole	230	140/280
1— 600	G.E.	MPC	550	600/800
2— 350	G.E.	MPC	220	450
1— 300	G.E.	MPC	230	250/400
1— 300	G.E.	MPC	230	275/550
1— 270	Whse.	Interpole	500	250/400
4— 150	Whse.	SK-201	230	300/900
2— 125	G.E.	CO-1832	230	625
1— 100	G.E.	MD8-108	230	460

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225/275 volt D. C.

3—1350/1650 K.W. Gen. Elec. Type HCC, 6000 amp., 225/275 volt; A.C. 6 phase, 25 cycle, 500 R.P.M., with Type AH Booster and 1600 K.V.A., Type HTH, 3 phase, O.I.S.C., 6600 volt transformer with taps.

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One HILLES & JONES Angle and Bar Shear for 6" x 6" angles and 1½" dia. bars maximum—Motor driven. No motor furnished.

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from 3/16" to 5/8" thick

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Pressure Blowers

(3) Buffalo Forge 1200 cfm. @ 11 oz. 7x7 outlet, 9½ inlet, with 7½ HP. 220 volt, 3 ph., 60 cycle, 1750 RPM motors.

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400 Cfm. 1802 Spencer Turbo Compressor. 12°0 cfm. @ 3¼ lbs. Gen. Elec. with 30 HP. 220/440 volt, 3 phase, 60 cycle, 3600 RPM motor.

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Spray booth complete with D. C. motor and compressor.

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2—5-TON Hulett Ore Buckets.
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"ANYTHING" *containing IRON or STEEL*"

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New and Guaranteed Rebuilt
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25 ton Browning Locomotive Crane
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1	P & H	20	42'	AC	
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1—43" 110 Volt Cutler-Hammer Lifting Magnet
Complete with controller, master switch, magnetic contactor, cable take-up reel with #6 magnet cable, voltmeter and generator of 125 V. Used very little.

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124' x 109' x 34'. 4 Stories high 9' 6" ceiling heights. Steel columns 18' apart with elevator 7' x 12'. Easy to move. Suitable for any purpose. Call or wire for further details.

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Even though our tonnages are not as large as heretofore, most sizes are usually available from warehouse stocks.
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VALVES and FITTINGS
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6—Stirling Water Tube Boilers, 600 HP, each with Harrington Stokers and Wing Blowers for forced draft, 2 blowers to each boiler, boilers equipped with Blaw-Knox Tracifiers.

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ADDRESS BOX V-300
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EXECUTIVE SALES ENGINEER desires connections in Chicago territory. 20 years experience in Sales and design of reinforcing, structural and misc. steel products. Capable full responsibility for management and production activities, good organizer and able to handle men. Address Box V-303, care *The Iron Age*, 100 E. 42nd St., New York.

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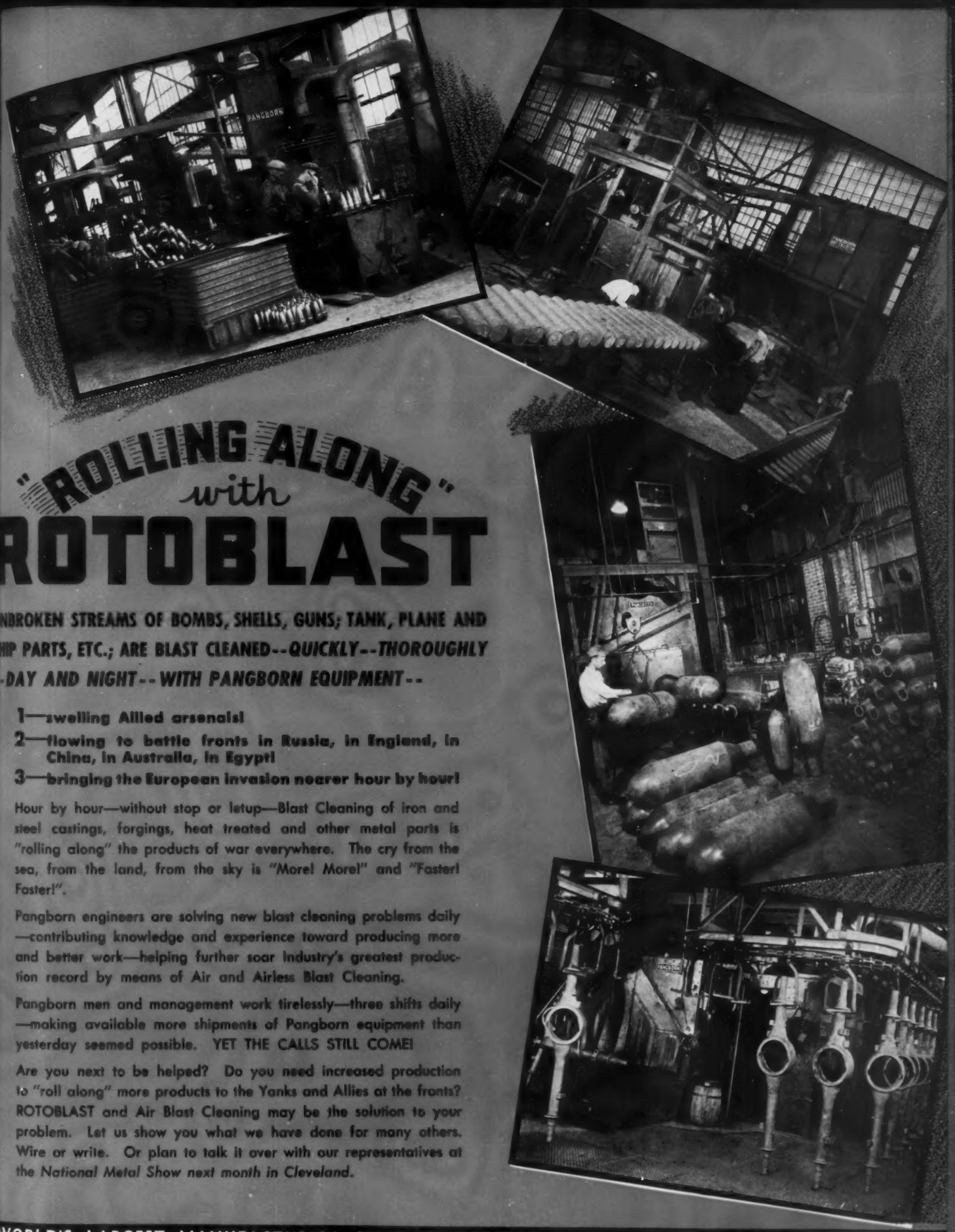

"ROLLING ALONG" with ROTOBLAST

NBROKEN STREAMS OF BOMBS, SHELLS, GUNS; TANK, PLANE AND HIP PARTS, ETC.; ARE BLAST CLEANED--*QUICKLY*--*THOROUGHLY* -DAY AND NIGHT--WITH PANGBORN EQUIPMENT--

1—swelling Allied arsenals!

2—flowing to battle fronts in Russia, in England, in China, in Australia, in Egypt!

3—bringing the European invasion nearer hour by hour!

Hour by hour—without stop or letup—Blast Cleaning of iron and steel castings, forgings, heat treated and other metal parts is "rolling along" the products of war everywhere. The cry from the sea, from the land, from the sky is "More! More!" and "Faster! Faster!".

Pangborn engineers are solving new blast cleaning problems daily —contributing knowledge and experience toward producing more and better work—helping further soar industry's greatest production record by means of Air and Airless Blast Cleaning.

Pangborn men and management work tirelessly—three shifts daily —making available more shipments of Pangborn equipment than yesterday seemed possible. YET THE CALLS STILL COME!

Are you next to be helped? Do you need increased production to "roll along" more products to the Yanks and Allies at the fronts? ROTOBLAST and Air Blast Cleaning may be the solution to your problem. Let us show you what we have done for many others. Wire or write. Or plan to talk it over with our representatives at the *National Metal Show next month in Cleveland.*

WORLD'S LARGEST MANUFACTURERS OF BLAST CLEANING AND DUST COLLECTING EQUIPMENT

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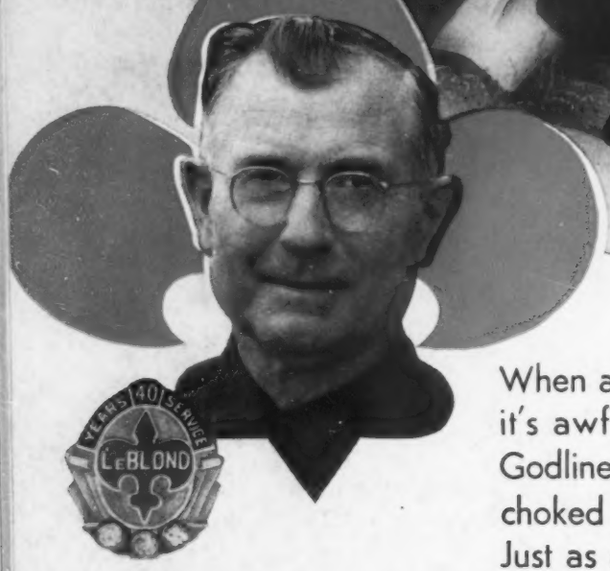
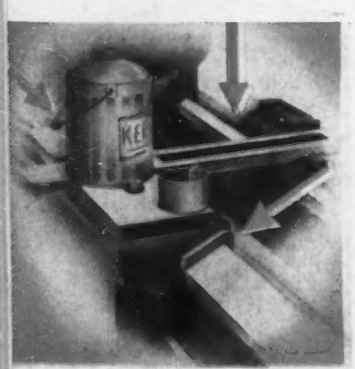
"I'm Tellin' You . . ."

(No. 3 in a series of tips on "Keeping 'em Turning")

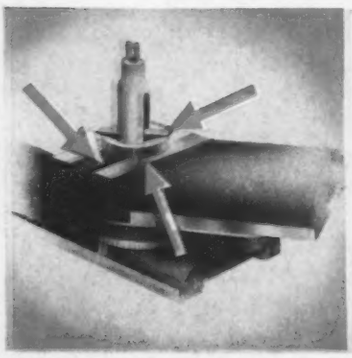
by **John Gauche—40 years with LeBlond**



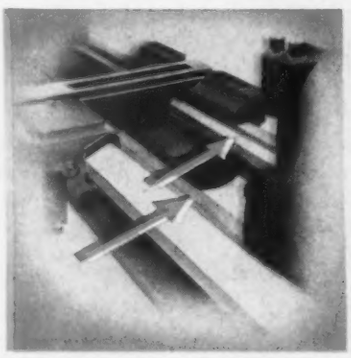
When a lathe hand gets absorbed in turning out a piece of work, it's awfully easy for him to forget that Cleanliness is next to Godliness. But if he does forget, and allows his machine to get choked up with chips and turnings—look out, brother, that's trouble! Just as a reminder, I'd like to point out the spots that need close watching to keep your lathe running accurately and smoothly.



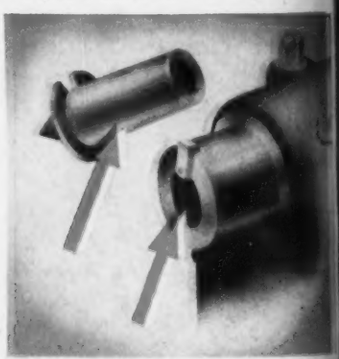
The wipers do a good job of keeping ordinary turnings out from under the carriage. But when you work with cast iron, you should remove the wipers occasionally and clean them in kerosene to rinse out the dust and grit.



When you place a tool in the tool post, check to be sure there are no turnings between the collar and the compound rest, or between the wedge and the collar. Your tool can't get a firm rest in a dirty tool post.



Don't move the tailstock along the ways without first carefully wiping off all chips. Turnings on the ways will throw the tailstock out of alignment and ruin your accuracy. Also keep tailstock spindle clean.



Before replacing center, wipe out the hole and clean the tapered part of the center. When using drills, chucks, or reamers be sure they are tight in the taper hole. If there is dirt between the two, the part will revolve and cut the taper hole.

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Cincinnati, Ohio

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